Can environmental citizenship be enhanced through social media? A case study of engagement in a UK University

Monica Pianosi

Institute of Energy and Sustainable Development

De Montfort University

This thesis is submitted to De Montfort University in partial fulfilment of the requirements for the award of Doctor of Philosophy

May 2017

Acknowledgement

I would like to thank my supervisors, particularly Dr Richard Bull, without whom this study would not have happened, and Dr Andrew Reeves, for his assistance with its completion. They are among the many people to have supported me at the Institute of Energy and Sustainable Development, which has provided a pleasant and stimulating place in which to work.

This research has been made possible as a result of a bursary and I am grateful to the Institute of Energy and Sustainable Development at De Montfort University for this funding.

It has also been made possible by many people inside De Montfort University, from the small donations of time by participants who agreed to be interviewed during the study, to the much bigger inputs by co-operating host of the social media channel; in particular I would like to thank Karl Letten and Dr Ian Murdey, without whom this study would have been much more difficult. A special mention and gratitude needs to be reserved to Dr Leticia Ozawa-Meida and Anna Strzelecka for their support, help and encouragement throughout the all study and especially in its last stages.

Lastly, but most importantly, I would like to thank Paolo, my family and my friends for their everyday help, encouragement and patience.

Abstract

The research presented in this thesis focuses around the question: "*can social media tools be used effectively to foster a participatory process that increases environmental citizenship and promote pro-environmental behaviour-change?*". The research aims to understand the role of staff and students in the socio-technical system that influences an institution's environmental impact.

Users need not to be educated, but empowered in order to be able to take decisions that would reduce the environmental impact of their institutions. Therefore a participatory process is suggested as the right tool to nurture environmental citizens, who will be able to take 'right' and 'good' decisions about their pro-environmental actions. In the last years, social media have emerged as a worldwide phenomenon. But alongside the grand claims of a social media inspired 'revolution' lie more nuanced questions around the role of digital tools in 'every day' contexts, and whether or not they are facilitating a cultural change or merely adding to the noise of modern life.

The thesis contributes to the debate through presenting findings from an action research study at an East Midlands University in which a case study approach was implemented to explore the potentialities offered by participating in decision-making regarding pro-environmental issues in the institutional context, as they are mediated by social media. To generate behaviour-change the two correlated theories of public engagement and environmental citizenship were tested.

Findings indicate that behaviour change and enhanced environmental citizenship are achievable through participation using social media, as several interviewees reported a change or a reinforcement of already existing pro-environmental behaviours as a consequence of the campaign. However, the reported changes were minor and it is difficult to advocate that they could noticeably contribute to the requested reduction targets on carbon emission from behaviour-change of the HE sector.

Publications and conferences

Murtagh, F., Pianosi, M. & Bull, R., 2016. Semantic mapping of discourse and activity, using Habermas's theory of communicative action to analyze process. *Quality & Quantity*, 50(4), pp.1675–1694.

Bull, R. & Pianosi, M., 2016. Social Media, Participation, and Citizenship: New Strategic Directions. *Analyzing the Strategic Role of Social Networking in Firm Growth and Productivity*, p.76.

Pianosi, Monica, Richard Bull, and Martin Rieser. (2014) *Is There a Role For Social Media in Enhancing Environmental Citizenship? Lessons From a UK Case Study*. European Conference on Social Media ECSM 2014. 10-11 July 2014. Brighton, UK

Murtagh, Fionn, Pianosi Monica, and Richard Bull. (2014) *Measuring Impact From Habermas's Communicative Action: A Case Study of the Evaluation of Impact in Social Media.* Decision Support Journal

Pianosi, Monica, Richard Bull, and Martin Rieser. (2014). *Impact, influence and reach: Lessons in measuring the impact of social media.* Environmental Communication: A Journal of Nature and Culture

Pianosi, Monica, Richard Bull, and Martin Rieser. (2012) *Enhancing environmental citizenship and reducing energy consumption through creative engagement with building users*. 2012 International Energy Program Evaluation Conference Proceedings, Rome, Italy

Visiting Lecture "Social *media and environmental citizenship: A DMU case study".* People, Society and Climate Change Module in the BSc in Sustainable Architecture. De Montfort University, Leicester, UK. March 2014

Visiting Lecture "*Enhancing Environmental Citizenship and reducing energy consumption of building users on social media".* Doctoral Degree Series. Graduate School. University of Palermo. April 2013

Visiting Lecture "Social *media and environmental citizenship: A DMU case study".* People, Society and Climate Change Module in the BSc in Sustainable Architecture. De Montfort University, Leicester, UK. March 2013

Conference Paper Presentation "*Using social media for behavior change: lessons in gathering meaningful data".* British Sociological Association Annual Conference, Leeds University. 23-25 April 2014

Conference Paper Presentation "*Enhancing Environmental Citizenship and reducing energy consumption of building users on social media".* Influencing Policy on Climate Change Conference. Cumberland Lodge, The Great Park, Windsor, Berkshire, UK. October 2013

Conference Paper Presentation "*Enhancing Environmental Citizenship and reducing energy consumption of building users on social media".* East Midlands Universities Postgraduate Research Student Conference, New Perspective 2013. University of Derby, UK. September 2013

Conference Paper Presentation "*Enhancing Environmental Citizenship and reducing energy consumption of building users on social media".* Life Beyond the PhD Conference. Cumberland Lodge, The Great Park, Windsor, Berkshire, UK. August 2013

Conference Paper Presentation "*Enhancing Environmental Citizenship and reducing energy consumption through the creative engagement with building users".* International Energy Program Evaluation Conference. Rome, Italy. 12-14 June 2012

Contents

List of figures

List of tables

List of charts

Abbreviations and acronyms

BEMS Building Energy Management Systems
BUS Building Use Studies
CO_2 Carbon Dioxide
DEFRA Department for Environment, Food and Rural Affairs
DESD Decade of Education for Sustainable Development
DMU De Montfort University
EC Environmental Citizen
eCons e-Consumer
eProd e-Producer
EEA European Environment Agency
GPS Global Positioning Systems
HEFCE Higher Education Funding Council for England
HEIs Higher Education Institutions
IESD Institute of Energy and Sustainable Development
ICT Information and Communication Technology
IoT Internet of Things
nEC non-Environmental Citizen
NHS national Health Service
PEBs Pro-Environmental Behaviours
SDC Sustainable Development Commission
SM Social Media
UK United Kingdom
UN United Nations
UNFCCC United Nations Framework Convention on Climate Change
UNCED United Nations Conference on Environment and Development
UNEP United Nations Environment Programme
US United States of America
WWF World Wide Fund For Nature
WCU World Conservation Union

1. Introduction

> *"Our electronic networks are enabling novel forms of collective action, enabling the creation of collaborative groups that are larger and more distributed than any other time"*
>
> (Shirky, 2008, p. 48)

The last decade has seen a revolution in how people communicate and engage with one another and with organisations. Digital technologies serve as the key part of information and communication of today's society. The influence of digital technologies is perceivable in all spheres of life, including economy, education, governance and private lifestyle. Usage of mobile computing devices and the Internet has dramatically increased together with citizens' expectations for fast and easy access to information. Citizens are therefore increasingly becoming '*digital citizens'* and the rise of social media have transformed lives for better or worse.

Alongside this digital revolution, overwhelming evidence of the impact of climate change on our planet has emerged. Climate change is at present widely recognised as one of the most pressing concerns facing humanity (IPCC 2013). In the 1990s climate change and environmental sustainability started to gain attention, in particular after the 1992 Rio United Nations Conference on Environment and Development (UNCED). Climate change was at the centre of attention at the conference and the United Nations Framework Convention on Climate Change (UNFCCC) started requesting countries to start to monitor and report their emissions (UNFCCC 1998). Government, organisations, local actors and individuals are all called to take action as climate change is expected to cause changes to the cultural, social and physical environment. In organisations, addressing climate change generally means mitigating the impacts of their activities and as such reducing emissions. Organisations are physically indivisible from the natural environment that surrounds them and would not exist or could

survive without the rest of the natural environment (Etzion 2007), although most institutions and the individuals that inhabit them might not be aware of this.

The awareness that our life-styles are damaging the environment has raised questions about who should take responsibility for action (Stern 2007). There is extensive research and practice that demonstrates that understanding the social and behavioural aspects of sustainability can be an successful strategy to reducing emissions (Whitmarsh et al. 2011; Stern 2000). However, many attempts at `pro-environmental change` rely upon individualistic and rationalist assumptions (Kollmuss & Agyeman 2002). Alternatively, public participation is increasingly considered to be an important aspect in the success of behaviour-change processes (Petts 2006; Petts 2001). It is widely accepted that if people have the opportunity to participate in decision-making processes, they will be more likely to adopt the outcome of the decisions (Webler et al. 1995; Owens 2000; Webler et al. 2001). This principle has been successfully applied in the context of waste management and landscape planning (Petts 1995).

As Shirky asserts collaboration of groups on social media have today the power of changing people's actions and as such can be a powerful tool in changing our society (Shirky 2008)s. Building on this principle, this thesis addresses the key question then of whether social media enabled engagement of people can help society reduce its environmental impact and move towards a pro-environmental model where citizens are more aware of their environmental impact and are motivated to act to reduce it, i.e. they are environmental citizens.

A case study of engagement on social media in a UK University is explored to shed light on this question. A campaign over an eight week period was implemented with the intent of not only being informative about environmental sustainability and pro-environmental behaviours, but mainly to provoke discussion and action amongst staff and students on a range of environmental issues (e.g. energy and water use, transport

and food choices, recycling, and others). The research drew upon analysis of social media interaction and interviews to understand the impact of staff and students pro-environmental behaviours in the overall frame of reducing a higher education institution emission. To understand behaviour-change the inter-related theories of public engagement and environmental citizenship were used (Webler 1995; Petts 2006; Bull et al. 2008; Dobson 2010; Bell 2005).

This chapter has begun with an overview of the thesis and the overarching motivation of the study: climate change mitigation. This is followed by the introduction of the debate between a technical and a behaviour-led approach to reducing emissions and changing behaviours in higher education institutions (Section 1.1) and the introduction of the case study (Section 1.3). A summary of the theoretical principles of the thesis and of the implementation of the research project follows (Section 1.2). The principal aim and objectives of the research are then presented (Section 1.4) and the structure of the thesis is outlined (Section 1.5).

1.1 Social media principles and engagement

In recent decades, media communication has evolved from a 'few to many' model to a 'many to many' approach; users' engagement has been enabled by digital technologies and new knowledge is today generated through co-creation by the community (Van Dijck 2009). The core of digital technologies and social media are about participation (Shirky 2008) (not all scholars agree with this school of thought, see for example (Fuchs 2007; Castells 2007); however these ideas will be further investigated in Chapter 3).

Similarly, in the risk communication literature there has been a move from the top-down 'information-deficit' model to a model that promotes Habermas's deliberative ideals (Irwin 1995; Bull et al. 2008; Wynne 1996). The theories of public engagement, deliberative democracy and citizen science have evolved out of theories of risk communication. Their grounding hypothesis is that by engaging all those involved in

the specific issue the outcome of decision-making processes are better and more legitimate. They work from Habermas's premise that participation is "*interaction among individuals through the medium of language*" (Webler 1995, p.40). And here it is where the links with social media emerge and where this study proposes to investigate. Similarities between risk communication, public engagement and social media theories are clear: people talking and working together can generate new forms of knowledge and contribute to more effective governance. As such, people can be a valuable source of knowledge and wisdom and, if given the opportunity, capable of handling complex information and resolving complex problems.

Big claims have been made in the last decade for social media to be a drawing force for a deeper democratisation of society, from the role they played in Obama's election (Cohen 2008), to the Arab Spring (Orr 2011). Moreover, social media have been used by government and institutions to engage the public on various issues (Stewart et al. 2012), including sustainability, and by activists to organise and mobilise protests (Gavin 2010). Researchers recognised the possibility of new media to permit greater participation and to foster a more egalitarian participatory form of citizenship (Flew 2008). Clay Shirky (2008) cites numerous examples of social media to connect and mobilize people for collective action. Increasingly, studies have been examining the potential of information technology and tools such as social media for behaviour change towards a pro-environmental model (Lehrer & Vasudev 2010; Foster et al. 2012; Burrows et al. 2013; Crowley et al. 2014).

1.2 Universities, sustainability and the public good

> *"Universities and colleges are widely recognised as leaders in society's efforts to achieve sustainability – through the understanding, skills and attitudes that students gain and put into practice, through research and knowledge exchange, and through*

> *community involvement, as well as through their strategies and operations that bring all these together"*
>
> (HEFCE 2014, p.4)

The vision statement of the sustainable development strategy of the Higher Education Funding Council for England (HEFCE) makes clear that the role of the sector in the journey to sustainability is two-fold: institutions are responsible for their own strategies and actions, but they also play a key part in the education and shaping of the future generations. Higher education institutions have the ability to instil the values of environmental protection in their graduates through teaching; as the UN Decade of Education for Sustainable Development (DESD) 2005-2014 states: *"Universities must function as places of research and learning for sustainable development"* (Arima et al. 2005, p.24). The UK's sustainable development strategy emphasises the role that education can play in both raising awareness among young people about sustainable development as well as giving them the skills to put sustainable development into practice (HEFCE 2014).

Higher Education Institutions (HEIs) can lead by example through the management of their estate and by setting best practices and being role model through the behaviour of teachers and other staff members in their own behaviours. (Lukman et al. 2013). In addition to this, they have a important role to play as the buildings of HEIs account for the 14.6% of greenhouse gases emissions within the UK public sector buildings (Bryan et al. 2011) and they can demonstrate to other sectors and businesses how to achieve emission reduction targets (HEFCE 2010). The importance of leading by example in promoting pro-environmental values is also important as the perception of inadequate action by local and national government is a substantial barrier to engage in pro-environmental behaviour amongst UK citizens (Lorenzoni et al. 2007a). People are reluctant to change their own behaviour when they feel others would not follow because individual actions seem to not have enough impact in relation to a global issue

such as climate change. Action by universities and in other institutions may therefore have a wider impact than the actual cut in carbon emissions.

A report for the Higher Education Funding Council for England (HEFCE) recommended a 50% reduction on carbon emissions against 1990 levels by 2020 (HEFCE 2009) in HE institutions. Two sets of bottom-up reduction were identified showing that in both scenarios a 50% reduction was achievable through cost-effective measures (i.e. improvements that would pay off for themselves in their lifetime), other non-cost-effective measures (i.e. improvements that would not pay off themselves, but will save carbon) and that behavioural change accounted for 10% in the potential for reduction in the sector (ibid., p. vii).

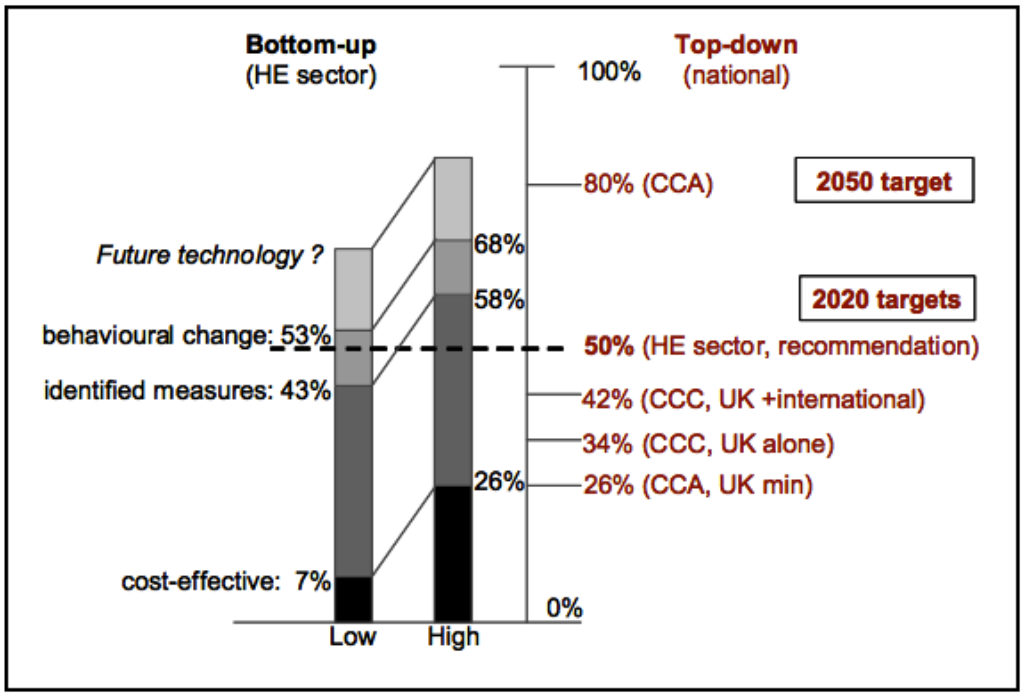


Figure 1. Contextualising HE sector targets (against 1990 baseline). Source: UK Government Climate Change Act; Committee on Climate Change (2008) (HEFCE 2009, p.vii)

1.3 Introducing the case study: De Montfort University

De Montfort University (DMU) is a large city-based University with approximately 27000 students and 3240 staff (DMU 2016). DMU is a useful case study because of its

natural accessibility for the researcher and its highly interactive community of social media users. Its interest in environmental and sustainability initiatives started with DMU's involvement in Leicester's successful plan to become the first environment city in 1991, followed by the establishment of the Institute of Energy and Sustainable Development (where the current study was undertaken) in 1994. A commitment to sustainable development is embedded in the University Strategic Framework:

> *We acknowledge our responsibility to cultivate sustainable working and learning environments that embody and promote equality of opportunity amongst communities, both within and outside the university.* (DMU 2015, p.5)

A comprehensive range of activities have been undertaken under the themes of research, teaching, estates management, community engagement and health and well-being to achieve better environmental performances (DMU 2011). As part of this, in 2011 the sustainability team at DMU decided to trial using social media as a tool for engaging staff and students. Having started with an *ad hoc* approach to using social media, in the autumn of 2012 the team decided to implement a specific campaign to engage staff and students in environmental initiatives through social media, which is where the present research comes into being.

The study proposes to explore the use of social media (in particular Twitter and Facebook) to enhance the environmental citizenship of staff and students from DMU. If people are capable of working out the best location for a waste facility and in the process they learn how to become better citizens, what would happen to DMU's staff and students if they were given the opportunity of improving the university's and their own environmental impact through different behaviours? Would they become better environmental citizens? Would they learn during the process? What would be the contribution of social media in the process?

Hence, a social media campaign was designed for the intervention stage of the research (details of the proposed methodology and the theoretical background are discussed in Chapter 4). This campaign was not an information-based campaign, but aspired principally at creating conversations with the aim of analysing them and of drawing insights on the fairness, competence and social learning reached by social media conversations, supposedly different from face-to-face. The intervention was implemented as an action research approach, as the intention was not solely to observe participants (through the medium of social media), but also to stimulate change. Hence, the researcher was introduced to the Sustainability Team of DMU and invited to collaborate with them during the 8 weeks intervention period to stimulate effective discussions about important issues concerning the university. Working with the 'experts' and their collaboration was crucial for this research as they are the people that have a good understanding and knowledge about the relevant and urgent problems in DMU to be tackled. Listening about the issues that participants cared about and the changes they wanted to conduct for DMU was also important. However, it added some constraints in the way the social media accounts needed to be managed, the tone and language used in conversations, the difficulty of dealing with conflicting issues and the impossibility of opening the deliberative process to practical and relevant issues, as the institution preferred to maintain the process to a theoretical level.

During the 8 weeks of intervention, the campaign and the Facebook and Twitter account were primarily managed by the researcher in the first person, who was responsible for the vast majority of tweets and posts on Facebook and for all the blog posts. As explained more thoroughly in Chapter 4, activity on the accounts was rather intense and time consuming and the researcher was immersed in it for the whole intervention with the outcome of being accustomed to many participants and of being able to observe their behaviours on social media, noticing change, understanding relationships and perceiving trends and tendencies of the community.

1.4 Aims and objectives

In light of the presented background theories this thesis presents a case study undertaken to investigate behaviour-change strategies mediated by social media in the higher education institutional context. Hence the overarching aim of this exploratory research is to:

Understand the potential of social media as a vehicle for increasing environmental citizenship and promoting pro-environmental behaviour-change.

The following objectives were identified to achieve this aim:

1. To review current behaviour change theories in organisations;
2. To map the rise and development of digital technologies and social media with reference to current trends;
3. To create and test a methodology for the analysis of social media participatory campaign and its effectiveness in facilitating public engagement;
4. To critically assess the potential of social media as a behaviour change tool leading to behaviour-change and environmental citizenship;
5. To understand the wider opportunities and barriers for future applications of social media and public engagement in organisations.

1.5 Thesis structure

This thesis has nine chapters. The chapters that follow are aligned with each of the Objectives above (see Table 1) and outlined below.

Objective	Chapter
1. To review current behaviour change theories in organisations	Chapter 3. Literature Review
2. To map the rise and development of digital technologies and social	Chapter 2. Background

media with reference to current trends	Chapter 3. Literature Review
3. To create and test a methodology for the analysis of social media participatory campaign and its effectiveness in facilitating public engagement	Chapter 4. Methodology Chapter 5. Quantitative analysis of social media data Chapter 6. Qualitative analysis of social media data
4. To critically assess the potential of social media as a behaviour change tool leading to behaviour-change and environmental citizenship	Chapter 7. Qualitative analysis of interviews
5. To understand the wider opportunities and barriers for future applications of social media and public engagement in organisations.	Chapter 8. Discussion of results

Table 1. Objectives of the study mapped on the thesis structure

Chapter Two. Background theory and research context

The chapter presents an overview of the motivations of the study. In particular it sets the context by defining the importance of organisations and of intervention in the higher education sector to mitigate climate change; it also introduces social media and the digital economy, as key components of the study.

Chapter Three. Literature review

The chapter provides a critical review of the current debate about behaviour-change intervention with particular attention of organisations and the non-domestic environment. Moreover, it analyses the public engagement literature and the links with the environmental citizenship theory. The second section of the chapter analyses the use of social media as a tool for public engagement and reviews the different theories about the use of social media for increasing participation in contemporary society.

Chapter Four. Research methodology

The chapter explores the philosophical approach of the research and explains the development of the methodology and of the research methods used for this study.

Hence, it contains the description of the design and implementation of the intervention and of the mixed methods used for the evaluation. It also defines the approach taken for data processing and analysis.

Chapter Five. Results: Quantitatively measuring the impact of discourse-based social media

The chapter presents the methodology used to explore and evaluate the effectiveness of discourse-based social media as a tool for facilitating participation. The aim of the chapter is critical as it reflects on the available social media marketing tools for evaluating online interventions and it defines their contribution to the debate about the impact of social media for pro-environmental behaviour-change.

Chapter Six. Results: Fairness and competence on social media

The chapter illustrates the translation of Weber's first two criteria for public engagement processes evaluation, fairness and competence, into the online discussion and presents results from the participants interviews.

Chapter Seven. Results: Social learning and social media. Is there a relationship?

The chapter presents results from the interviews relating to the 'beyond the process' impact of the intervention. It tests the power of discourse-based social media as a possible route for social learning and environmental citizenship. It also investigates the impact of social media on people's lives and the depth of engagement achievable in the online environment.

Chapter Eight. Discussion of results

The chapter discusses the findings from social media monitoring and the interviews, in respect to previous research and describes the potentials and barriers to using social media as a tool for participation and behaviour-change in organisations.

Chapter Nine. Conclusions

The final chapter presents a brief summary of the key findings of the thesis and discusses the contribution to knowledge. It also highlights the research limitations and the potential areas for future research.

2 Environmental citizenship in the digital age

The chapter explores the context of this thesis by introducing the key themes of the research. Starting with exploring the initial ideas behind the digital economy and social media the chapter goes on to outline the rise of digital citizens and the claims around the benefits of social media for the civil society and governance.

2.1 The digital economy and social media

2.1.1 A definition of Web 2.0

The term Web 2.0 is currently associated with web-applications that facilitate participatory information sharing and collaboration on the Web (Sharma 2009). The term was first used in 2004 to describe how software developers and ordinary users were using the Internet: decentralisation, user-focused, and user-led (O`Neill & Boykoff 2011). Web 2.0 sites allow users to interact and collaborate with each other as creators of content. In contrast, the top-down and expert-led Web 1.0 model viewed users as consumers whose activities were limited to the passive viewing of content that was created for them (Kaplan & Haenlein 2010). The motivation for Web 2.0 growth comes from its unique ability of linking together people, power and knowledge (Kulathuramaiyer & Maurer 2015).

From the late 1990s onwards, Blogger (1999), Wikipedia (2001), Facebook (2004), Flickr (2004), YouTube (2005), Twitter (2006) and a wide array of other platforms started to offer online tools that made possible for masses of users to participate in content creation on social networks, blogs, wikis, and media sharing sites (Van Dijck 2013). As Lev Grossman explained: *"It's a story about community and collaboration on a scale never seen before. It's about the cosmic compendium of knowledge Wikipedia and the million-channel people's network YouTube and the online metropolis MySpace."* (Grossman 2006).

The first sites classified as 'social media' were the music-based site MySpace (started in 2003), and Facebook, launched by Mark Zuckerberg in 2004 (Kaplan & Haenlein 2010). Devised on the principles of Web 2.0 – user-generated content and collaboration – these sites have witnessed incredible success and popularity. Social media is not a homogenous term though; different scholars have tried to distinguish the different types and groups of social media (Van Dijck 2013; Kaplan & Haenlein 2010):

1. Social networking site, also called social media, e.g. Facebook, Twitter, LinkedIn, Google+; these applications enable users to create personal profiles, connect with friends and colleagues and send messages. Profiles can include any type of information, such as videos, photos, blog posts. The largest social network is Facebook (Shannon Greenwood et al. 2016), which is very popular especially among older Internet users. Today these applications are also heavily used by companies aiming to create brand communities or for marketing research, but also by associations and institutions.
2. Collaborative projects which allow for individuals to contribute to the content of sites or which enables the collection and rating of links or media content; examples are Wikipedia and Pinterest. The underlying idea is that the joint effort of different actors will lead to a better outcome that any individual contribution could achieve.
3. Blogs which are generally maintained by a single person but allow for interaction through the addition of comments. These are the earliest form of social media and are most commonly text-based, but could take different media formats.
4. Content communities aimed at sharing media such as YouTube, Flickr, and Slideshare. Communities have the risk of being used to share copyright-protected materials, although most of them have rules in place to ban and remove illegal content.

Social media are, however, a very dynamic object, rather than being a finished product. In fact, they are continuously tweaked in response to their users' needs and also in reaction to their competing platforms (s it is visible in the changes implemented in the last year by Instagram to beat its rival Snapchat) and larger technological and economic infrastructure (Van Dijck 2013).

2.1.2 A definition of Social Media

There are different definitions of social media: Boyd defined them as *"web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by other within the system"* (Boyd & Ellison 2007, p.111; Boyd 2014); Scott and Jacka (2011, p.5) contend that social media are *"the set of web-based broadcast technologies that enable the democratization of content, giving people the ability to emerge from consumers of content to publishers"*; Crowley et al. (2014, p. 384) instead define them as *"any web based service that acts as a mean of interaction among people in which they create, share, and exchange information and ideas in online communities and networks".* Building on these definition, for the purpose of this study an alternative definition of social media is proposed whereby social media are web-based systems that allow mass interaction, conversation, and sharing between members of a network. As such, social media are defined by four main characteristics: user-generated content, community, rapid distribution and an open two-way dialogue.

Although they are a relatively recent phenomenon there is a large number of different social media sites that meet the previous definition, such as Facebook, Twitter, Google+. These platforms are quite consistent about their technological features, but diverse for the cultures that emerge from them. Most of them support the maintenance of pre-existing social networks, but others help strangers connect based on shared interests. Since their introduction, social media platforms have attracted

millions of users and have been integrated into people`s daily practices (Fuchs 2017). To date Facebook accounts for 1,9 billion active users, Instagram for 600 millions, Twitter for 319 millions, Google+ for 400 million (Statista 2017a). According to the Pew Research Center, 69% of Americans used some type of social media in 2016, an incredible value compared with the 21% reported usage in 2008 (PewResearchCenter 2017).

Facebook was founded in 2004 by Mark Zuckerberg for students of Harvard University (Carlson 2010). In September 2005 it was expanded to include people outside of the University. Facebook has seen remarkable growth, increasing from 5 million users in 2005 to more than 900 million in 2012 and it reached 1.23 billion daily active users on average by December 2016 (Facebook 2017). Twitter has nearly 500,000 new accounts created every day (Healht Research Institute 2012). In the United States, 86% of adults are Internet users and 79% of online adults visit social media sites (Shannon Greenwood et al. 2016). Figure 2 shows the percentage of American Internet users that are active on the different social media sites; as it is apparent Facebook is the most popular platform. As presented in the cited report by the Pew Research Center "*A majority of Americans now say they get news via social media, and half of the public has turned to these sites to learn about the 2016 presidential election. Americans are using social media in the context of work (whether to take a mental break on the job or to seek out employment), while also engaging in an on-going effort to navigate the complex privacy issues that these sites bring to the forefront*" (Shannon Greenwood et al. 2016, p.3).

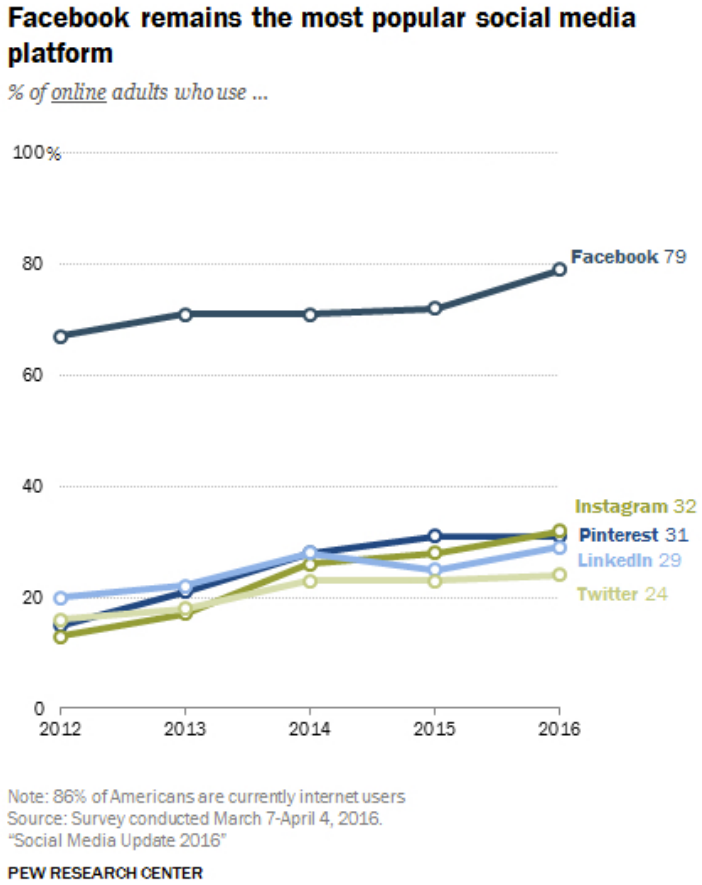


Figure 2. Social Media Usage 2016 (PewResearchCenter 2017)

The rise of social media indicates a shift in the organisation of online communities from websites dedicated purely to communities of interest to social media sites structured as personal networks with the individual at the centre of their own community.

2.1.3 Social media as participatory culture

Social media research has been studying the network structure of friendship and the roles that people play in the process of sharing information (Kumar et al. 2010). Any website that uses a 'social' or 'web 2.0' philosophy lets users participate in conversations that are multidirectional, transforming information into an interactive dialogue. A continuous stream of communication—associative ideas, tastes, interests,

hearsay, buzz, likes, dislikes, and news—is generated by users on digital platforms and is gradually becoming a new communication space (van Dijck 2012; Dahlgren 2013). Social media have an important role in supporting participation through linking participants. Social media help people to socialise with users with similar interests and concerns and can shape users' beliefs (Boyd & Ellison 2007). In the initial stages of social media, the question arose whether this new form of mediated sociality represented a new kind of public sphere. Terms such as participation, democracy and collectivity tacitly borrowed Habermas's ideal of political communication and enabled commentators to claim the value of these tools as new carriers of the public sphere (van Dijck 2012). However, discourse and communication on social media are very different from verbal communication; although it is informal discourse it is no longer verbal and ephemeral, but registered, manipulated and made publicly available, unless the users decide to make the conversation private by choosing to interact in a closed group or limiting the visibility of their account. As such, publishing an idea or personal judgement on the web is very different than expressing it verbally (van Dijck 2012).

The 'link mechanism' is one of the most powerful mechanisms of social networks. Social websites link together people, members, events, pages and groups. This mechanism makes it easier for people to discover new ideas and social movement, because their `friends` have been engaged in them. This 'viral' nature of social media enables people to share quickly and easily information with a number of contacts that was not predictable before the birth of social network sites (Jenkins et al. 2013). "*It is within these large networks that 'social contagion' is possible, leading to changes in behaviour and actions*" (Christakis 2008).

For these reasons, scholars and researchers have argued that in today's online world, our society and our culture are becoming more democratic (Shirky 2008; Tapscott & Williams 2008; Bruns 2008). They argued that the technological potential of the Internet are significantly altering the public sphere because everyone has the possibility of 'producing' culture instead of only being limited to listening or watching

information shared by newspaper, radio, and television (Fuchs 2017). However, social media platforms are anything but 'free spaces' where opinions are negotiated so that collective opinions can be formed (Fuchs 2012). Ironically, they may exclude individuals from taking part in real collective actions but convert political engagement into a "*point-and-click*" occupation that is unproductive as a social tool (van Dijck 2012). This thesis will investigate the links between online participation and practical engagement.

In addition to this, evidence from the Maiden Square protest in Ukraine indicates that the use of social media did not aid in overcoming political divisions (Duvanova et al. 2015). It is in fact difficult for Twitter users to be exposed to ideas from a different ideological point of view because they are organised in clusters of users they follow and these clusters are usually politically and ideologically standardized (Himelboim et al. 2013).

2.1.4 Social media discourse

Descriptions of social media, especially of the microblogging social network Twitter, often imply that they are a form of discourse or conversation that involves some form of 'conversational exchange' (Zappavigna 2014; Honeycut & Herring 2009; Wikström 2015). It is described differently by different authors: Kate et al. (2010, p.242 in (Zappavigna 2012)) describe it as a '*lightweight chat'*, Zhao & Rosson (2009, p.251) as a '*prompting opportunistic conversation*', Holotescu & Grosseck (2009, p.1) as '*a specific social dialect, in which individual users are clearly singled out and engaged in conversations*' and Ritter et al. (2010) as constituted by '*dialogue acts*'. On social media it is also possible to assist to a commercialisation of conversations (Zappavigna 2012) as businesses are recommended to be active and interact with users where they are already active and having conversations one with the other (Bradley 2010; Tsimonis & Dimitriadis 2014). In this way microblogging and social media are applied to

personal branding and generating word-of-mouth around certain interests, products, or topics with the intent of generating profit.

On the other hand, Yardi & Boyd (2010, p.325) remind that exposure to conversation on Twitter can have an edifying influence:

> *"Twitter affords different kinds of social participation. In the same way a reader has to skim the front page of a physical newspaper […], most Twitter users will be exposed to varied slices of news. Thus, many people may be witnessing diverse conversations and also participating in topics they otherwise may not have"*

All these kinds of structural configurations are mediated by the nature of the channels themselves in parallel with what happens with face-to-face conversations. The language used in social media, especially when conversations are open to the public (which is the case of non-restricted Twitter profiles), is under significant interpersonal pressure (Zappavigna 2012). The creation of interpersonal meanings is what constructs and supports communities on social media. Rheingold (1993, p.5) proposes that *"virtual communities emerge from the Net when enough people carry on public discussions long enough, with sufficient human feelings, to form webs of personal relationships in cyberspace"*.

Reflecting on the potential of discourse-based social media of creating conversations and engagement, the parallels with public engagement theory emerges as participation exactly is "*interaction among individuals through the medium of language*" (Webler, 1995, p. 40)

2.1.5 Issues of privacy on social media

On social media, people exchange large amount of information and disclose many data about themselves. These platforms are structured to stimulate the disclosure of

information to achieve many positive aspects; such as establishing new friendships, finding support or information, and maintaining relationships (Ellison, Steinfield, & Lampe, 2007). However, there are threats related to the use of social media (Sicari et al. 2015), because revealing personal data is sometimes correlated with various legal issues, such as harassment, sexual predation, defamation, intellectual property rights, and criminal laws among others (de Zwart, Lindsay, Henderson, & Phillips, 2011). On social media, self-disclosure does not only refer to the quantity of information that a person chooses to disclose (Joinson & Paine, 2007), but also to the ease with which a user can be identified as a real person (Gandey, 2000). On the other hand, the social media space is the ideal set for self-presentation of individuals (Papacharissi, 2002); social media are in fact often used as a stage and people manipulate information, by selecting what to reveal and what to hide.

The relative anonymity of web interaction can make individuals feel safe talking about sensitive or dangerous issues (Herring et al. 2002). Some authors, such as Coffey & Woolworth (2004) have highlighted that anonymity can play a central role on social media in fighting discrimination. Anonymity has, for example, been used to obtain attention for minority groups through the expression of unpopular views (McKenna & Bargh, 1998). On the other hand, Internet anonymity appears to release inhibitions and has been a vehicle for harassment, illegal activity and hate speech (Ess 1996). An example is the blogger known as “the Gay Girl in Damascus” who became a news source in the protests in Syria and was subsequently found to be an American man living in Scotland (Addley 2011). Anonymity can also encourage ‘trolling’, the uncivil use of social media or other Internet-based forum to provoke, degrade and distract others (Youmans & York 2012). For these reasons, Facebook creators argued publicly for limiting online anonymity as a way to prevent abuse (Zhuo 2015). Today in fact, Facebook’s terms of service require that “*users provide their real names and information*”.

Despite the security and privacy illusion of social media, these online fora can be accessed by hostile individuals (Herring et al. 2002). Both Google and Facebook, for example, have been subject to debates about privacy. 31 millions of users initiated a lawsuit action against Google after Google's Buzz social networking service publicly revealed users' email contacts without permission (Grimmelmann 2009). Also Facebook was very slow in implementing privacy settings and sometimes these did not work correctly (Debatin et al. 2009). This is particularly important in case of citizen journalists and activists, as they lack the protection of institutional affiliation, when they play a role as information gatherers in the context of controversial events, e.g. the Arab uprising (Rosenstiel & Mitchell 2012). In this context, being able to operate in condition of anonymity is often essential. But anonymity also goes against the commercial interests of social media services; Facebook, Google and other tool collect valuable consumer data and as such are interested in knowing real names.

Today, the habit for each social media service to write their own code of practice is widespread, which can be very prohibitive. For example, Facebook's 'Statement of Rights and Responsibilities' states that users will "*not bully, intimidate, or harass any user"* or *"post content that is hateful, threatening, or pornographic; incites violence; or contains nudity or graphic or gratuitous violence*". Whereas Twitter is less prohibitive stating that users "*may be exposed to content that might be offensive, harmful, inaccurate, or otherwise inappropriate*" (Youmans & York 2012, p.6).

2.1.6 Social media and trust

Trust can be defined as the belief that the characteristics of social media would inhibit opportunistic and dangerous behaviours (McKnight et al. 2002; 2000); this is an essential condition for disclosing information, but its influence on self-disclosure is only indirect (Sicari et al. 2015; Zimmer 2010). People with higher levels of trust are more comfortable with discussing more intimate topics and as such often decide to disclose more personal information. On the other hand, people that are not willing to

disclose personal information explain that this is due to concerns related to privacy (rather than trust) and worries about the control they have over the information they share (ibid.).

It has been disputed in the literature if social media have a positive, negative or no effect on trust. It is here outlined what is said in the literature. *Social media has a negative effect on trust*. Although there might be a rational argument for this hypothesis, in a review of the literature (Håkansson & Witmer 2015) did not find any studies that uncovered a negative relationship between social media and trust. *Social media has a positive effect on trust.* Many studies show that social media actually have a positive effect on trust. Monforti & Marichal (2014) for instance found that digital skills are associated with higher level of generalized trust, although this was true for African-Americans, but not for Latinos or Anglo-Americans. Liss (2011) investigates the negotiation process of a natural gas deal with an energy company. Trust between parties is in this situation an essential element of the mediation. The Internet and social media facilitated not only access to information by the creation of a website where members could privately log-in and communicate with each others, but also facilitated communication between the two parties. The use of Internet and social media were able to build trust, by enabling easy sharing of information and communication. In a web survey of college students from Texas Valenzuela et al. (2009) also found a positive relationship between the intensity in the use of Facebook among the students and their life satisfaction, civic engagement, political participation, and social trust. *Social media has no effect on trust.* Few studies claim that there is no effect on trust related to social media and Internet use. To cite one, Uslaner (2004), using data from surveys of the Pew Center on Internet and Internet Use, found that Internet users tend to have a slightly wider social life, but since Internet communications happens between users that are usually already connected in real life, Internet users tend to be neither less nor more trusting than non-Internet users.

2.1.7 Social media in Higher Education Institutions

There is not a better place to understand the ubiquity of social media use in today's society than at university. Considering the young audience in the HE setting, social media are no more noticeable in this context than any other. Universities have in the last decade started to embrace social media and to understand the potential power and implications for using it as a component of their education and communication strategy (Reuben 2009).

Regarding institutions using social media, it has soared in the last years. Reuben (2009) surveyed HE institutions in US and found that just over half of the universities and colleges had a Facebook or YouTube profile, whereas a similar survey conducted in 2011 (Barnes & Lescault 2011) reported that 100% of universities and colleges surveyed reported using some sort of social media, with Facebook (used by 98%) and Twitter (used by 84%) being the most prominent (Davis et al. 2012).

Regarding the use of social media in institutions, Davis et al. (2012) reported that social media tend to be used for ad hoc communication for individual faculty, administrative offices or departments rather than being part of a systemic institutional strategy to use social media for communication. When used at the institutional level, Twitter has indeed proved to be a successful tool to create live and up-to-date notifications for class commencement, events, training sessions (Wilburn 2008) as well as emergency alerts (Swartzfager 2007). In addition, some admissions offices have started to show student blogs to present the experiences of current students as a tool for recruitment (Harris 2008).

Table 2 presents the different ways in which social media are used in the HE sector. There are 4 main groups of actions performed by institutions through (or thanks to) social media: (1) Using social media to support learning, (2) Supporting students, (3) Building the community, and (4) Expanding the connections with past students and other stakeholders (Davis et al. 2012).

Learning/Academic	Student Support	Community Building	Expanding Connections
Faculty communicate with and engage students in their courses	Provide student support	Build and strengthen community	Connect students with alumni
Construct links between Facebook and Blackboard so students can check class assignments and receive course announcements	Offer workshop and financial aid	Increase sense of belonging for students taking online course	Conduct outreach to community
Create stronger learning communities	Resolve issues and allow students and the community to provide feedback to the university	Actively encourage and facilitate student involvement and participation in activities	
Post portions of lectures for downloading	Offer orientation	Invite participation in campus-wide blogs	
Facilitate class discussion and group project work	Provide mentoring to students		
Facilitate study groups and other in-class collaboration	Help to navigate the registration process		
Boast about students' academic accomplishments	Aid in improving student retention		
Recruit students into specific academic programs			

Table 2. List of ways in which Universities described uses of social media; from (Davis et al. 2012, p.13)

Examining Table 2 it is evident that most of the use of social media for communication is aimed in a one-way direction: from the institution to the students. This use does not utilise the full potential of social media.

2.2 The rise of the digital citizen

The many activities made possible by the Internet have changed modern life; today our society has a strong online component with participation online taking many different forms. Most Internet use is related to consumption, entertainment and social contacts, and only a small portion of use can be considered political participation (Dahlgren 2011). According to Dahlgren (2011) the Internet has altered the infrastructure of the public sphere and contributed to a transformation of contemporary society through making a vast amount of information available and visible. He claims that the Internet has fostered decentralisation and diversity and facilitated interactivity and communication thus providing a seemingly limitless communicative space and creating the premises for redefining civic engagement.

Some scholars argue that this new world of information has a positive impact not only on personal development but also on the character of our civilization (Blaagaard & Chouliaraki 2014). Applications like Facebook and Twitter have been credited to having a role in numerous moments of activism and social movements. Events like Obama's 2008 election victory (Zhang et al. 2009), the Arab Spring (Ghonim 2012), the Libyan crisis (Morris 2014), the #Occupy movement (Juris 2012), anti-austerity movements, such as the Spanish (Anduiza et al. 2014), Greek (Theocharis et al. 2015), and Portuguese (Accornero & Ramos Pinto 2015), and the Maiden Square protest in Kiev (Kurkov 2014).

US President Trump himself proclaimed that Twitter and Facebook helped him win the 2016 election (CBSNews 2016). Shirky (2008) cites numerous examples of the use of social media to connect and mobilize people for collective action such as the ability of people to self-organize photographs on Flickr, contribute their knowledge on shared documents such as Wikipedia and engage in social activism. In addition to this, other research have found that certain uses of social media can contribute to building trust and civic engagement (Shah et al. 2005), increase news consumption (Althaus &

Tewksbury 2000) and volunteerism (Jennings & Zeitner 2003), and enhance personal interaction (Hampton & Wellman 2003).

However, although researchers have argued that *"the revolution will be live-streamed, tweeted and posted"* (Bohdanova 2014, p.136) on social media, many of the 'revolutions' mentioned before have actually failed; the political status-quo has been restored in Ukraine (Kurkov 2014), authoritative regimes have returned in Egypt and Libya has fallen into a protracted war. This is because, according to (Lynch 2011), social media-based forms of political organisation "*have major weaknesses when the time comes for negotiating the terms of democratic transition"* (ibid., p.302).

Social media are not free of criticism though. Occupying a place alongside mobile communication, Castells (2007) refers to the Internet and digital media as 'mass self-communication', social media are a form of horizontal networked communication that is far from the democratic claims made by some. With only approximately 10% of users generating over 90% of the content (Arthur 2006) there is understandable scepticism over the role and impact of social media and the limits of 'point and click' politics (van Dijck 2012). In addition to this, analytics over the type of content shared on social media reveal that 40% of Tweets can be classified as 'pointless babble' (van Dijck 2012) and participants appear to huddle together in like-minded communities of interest (Dahlberg 2001b). Other voices also argue that the new world of Internet is undermining our capacity to think, read and remember (Carr 2010) or that the participatory Web 2.0 is eroding our values, standards, creativity and cultural institutions (Keen 2008).

It would therefore be seen as an overstatement to say that *"the Internet will save democracy by enhancing democracy"* (Dahlgren 2011, p.17); a motivation for deeper and stronger participation cannot be reduced to the presence of digital media per se, as this increased participation needs to come from other sources. However, the on-going transformation of media and the Internet is having a profound impact on the

dynamics of democracy and participation; new media facilitate the precondition for participation due to access to new resources that can foster civic engagement.

Of course not all scholars agree with this view; whereas Diamond (2010) sees the Internet as primarily a 'liberation technology', Morozov (2011) exposed the 'dark side of Internet freedom'. It needs to be noted that online technologies had not been designed for thorough and elaborated critical discussion, which might fuel social learning and long term changes (Lewinski & Dima 2012). As Rheingold (2002) underlines it is through an unintended use of online technologies that the Internet established its liberating credentials. The Internet was created from a secret military project to secure efficient command and control in case of a nuclear war. YouTube, Facebook and Twitter were instead developed as commercial platforms focused on entertainment and semi-personal communication (Lewinski & Dima 2012). In addition, other scholars question the ability of social media to support critical thinking; being overwhelmed with information disturbs our cognitive power. This has the consequence of deteriorating our reflection powers which deters insightful thinking and creative work (Carr 2010).

The notion that on-line spaces are neutral or uncontested has also been exposed as idealism (Castells 2007; van Dijck 2012). Mass self-communication spaces such as Twitter and Facebook, are still subject to power relations and self-interest. Governments, corporate interests and the media are all influencing and affecting these on-line public spheres in ways that challenge the democratic and deliberative nature of the Internet. Critical theorist Jürgen Habermas' concepts of the public sphere and communicative competence have been explored as possible interpretive tools for the success or impact of social media (van Dijck 2012; Dahlberg 2001b). Similarly, Habermasian ideals have been utilized within the risk communication literature where similar claims have been made around the power of discourse, participation and collaboration (Webler et al. 1995; Bull et al. 2008; Petts & Brooks 2006).

On the topic of critics of social media, a special mention needs to be given to the US 2016 elections and the claims made by various parties that social media had a deep impact on the outcome of the elections. These parties claim that victory was awarded to Donald Trump due to the aggressive and unfair use of social media made by him and his supporters through the diffusion of fake news. Allcott & Gentzkow (2017) instead suggest that this is not attributable to social media, as these were not the most important source of news of the election. Even the fake news that was circulated most widely was only seen by a small percentage of the American people. From their estimation, each fake news story would have had to convince 0.7% of non-voters or Clinton voters who saw the fake news to vote for Trump to change the outcome of the elections. This is the equivalent of watching 36 television campaign advertisements.

2.3 Digital citizens and environmental citizens

The rise of user generated content has enabled pro-environmental views to effect mainstream opinion (Kalafatis et al. 1999; Barber et al. 2009). Social media and blogs have created opportunities for bringing people closer to environmental issues and created deeper opportunities for environmental citizens to ask for change (Luck & Ginanti 2013). Previous research into bloggers' activity around political participation has demonstrated that blogs have the potential to shape public discourse and participation as fora to express passionate views (McKenna & Pole 2004). As Muldoon (2006) proposes, a sustainable society is possible only when citizens play their part in encouraging greater participation around environmental issues. Blogs and social media have been embraced as a platform for communicating environmental citizenship by different stakeholders: private citizens institutions and companies. The interactive features of Web 2.0 are a useful tool for discussing citizenship activities, eliciting feedbacks, engaging audience in dialogue and monitoring public opinion (Kent & Taylor 1998; Maignan & Ralston 2002). Social media create an environmental public sphere where environmental issues are identified and discussed (Torgerson 1999). Recent

research into consumers' environmental citizenship has confirmed that the virtual space is a space where citizenship can be individually exercised and communities can be created through discussion and dialogue (Rokka & Moisander 2009). Environmental citizens are not attached to a specific location (Luck & Ginanti 2013) and can be defined "location-less", (Bell 2005). Due to the ability of social media to connect people with similar interests, these platforms have become for environmental citizens the place to express environmental concerns and to discuss these concerns in a constructive way (Torgerson 1999).

2.4 Summary of the Chapter

It is argued then that citizenship is being re-defined through a wider participation in digital technologies that are increasing the citizens' sense of responsibility (Mitchell & Casalegno 2009). As a result, citizens' activities become an expression of efficient political practices. Digital technologies are seemingly a liberating tool because they allow citizens to engage in more democratic actions and to participate in local governance. However, the level of control these technologies allow also suggest a restriction of citizens' freedom. In particular, global technology companies which provide these tools, such as IBM or Cisco, might not have the same liberating objectives and might be interested in collecting data for different purposes (Gabrys 2014).

Currently, the engagement of users in their local and global community is facilitated by ICTs. They made it possible for people to come into contact, but, most importantly, to collaborate. In this way information is not only created by experts and the mainstream media, but also by common citizens, who are now facilitated to express their opinion. However, the gap between awareness and action replicates itself in the digital community, as people have the possibility to engage in conversation about the environment, to sign petitions and to be cyber-activists. Passy & Giugni (2001a; b) found that strong participation for activists was sustained only if participation could be

integrated into other activities and life goals of the participants.

The broad research question then is to explore the purpose and effectiveness of a participatory campaign on social media for environmental citizenship. Before outlining how this is conducted in more depth, via the research methodology, the relevant academic literature is further explored in Chapter 3.

3 Literature review behaviour-change, participation and the use of social media

This chapter introduces and examines the three inter-related concepts covered in this study:

5. In section 3.1, and 3.2 a critical review of current approaches to changing behaviours is presented;
6. In section 3.3, 3.4 and 3.5 public participation is introduced and a review of the meanings of social learning is presented;
7. In section 3.6, and 3.7 the different context of citizenship are discussed moving from environmental to digital citizenship.
8. Finally, section 3.8 concludes the chapter with identifying the research gaps.

3.1 Defining pro-environmental behaviour

A number of syntheses of behaviour change models have been completed by various authors, such as Darnton (2008a), Darnton (2008b), and Jackson & Surrey (2005). Due to this complexity, it is beyond the scope of this review to present all models available. Instead the aim of the section is to provide a rationale for why environmental citizenship and public engagement have been adopted in this study.

The notion of sustainability is problematic because it is context-specific; it has been used to describe an extensive range of activities and with multiple meanings for people in different places. Yet, the IUCN, UNEP and WWF (1991) states that the aim of sustainability is to *"improve quality of human life while living within the carrying capacity of the supporting eco-systems";* as such sustainability can be defined as having a economic, social and environmental dimension (UN General Assembly 2005). The recognition that human behaviour has a detrimental impact on the environment is central to the environmental agenda.

Pro-environmental behaviours can be described as behaviours that deliberately pursue the reduction of the negative impact of humans' activities on the natural environment (Stern 2000). There is a range of pro-environmental behaviours that are the focus of behaviour change studies and programmes. They include: water and energy conservation, waste management and recycling, maintenance and promotion of biodiversity, transportation, healthy lifestyles. These behaviours can be implemented at the individual level (COI/DEFRA 2007), but also at an organisational level (schools, community groups and workplace) (Bartlett 2011). Within an organisation, Ones and Dilchert (2012) describe employees pro-environmental behaviours as '*scalable actions and behaviours that employees engage in or bring about that are linked with, and contribute to, environmental sustainability*'. These behaviours are categorised as: working sustainably (e.g. creating sustainable processes and products), avoiding destruction (e.g. preventing pollution), conserving resources (e.g. reusing), motivating others (e.g. training and educating for sustainability) and taking initiative.

Stern (2000) states that environmentally significant behaviours can be defined by their impact on the environment. The impact is defined as the *"extent to which it changes the availability of materials or energy from the environment or alters the structure and dynamic of ecosystems or the biosphere itself"* (Stern 2000, p.408). For example, changing purchasing behaviour in general has bigger environmental benefit than reusing or recycling (Gardner & Stern 2008). Likewise, reducing car use or lowering thermostat settings would decrease environmental impact considerably more than bringing reusable bags in stores.

In the contest of a university, it is difficult to estimate the impact for which staff and students are responsible. The dissimilarities that occur in individual behaviour can in fact produce significant differences. If Janda's well-known quote, "*buildings don`t use energy, people do*" (Janda 2011, p.17) is true, then the institution per se is not responsible for having an impact on the environment, but the people that use and inhabit the institution are responsible for its overall impact on the environment. In

the context of energy use, for example, individual actions account for approximately half of the energy consumption across all sectors, while people in their roles as decision-makers in institutions account for the other half. From this perspective, people are responsible for the entire energy use in a building or organisation (Janda 2011). Growing evidence in academic literature demonstrates that the potential for energy saving due to measures targeting behaviour is large (see Table 3).

Intervention	**Range of energy savings**
Feedback	5-15%
Direct feedback (including smart meters)	5-15%
Indirect feedback (e.g. enhanced billing)	2-10%
Feedback and target setting	5-15%
Energy audits	5-20%
Community based-initiatives	5-20%
Combination of more than one interventions	5-20%

Table 3. Potential energy saving due to measures targeting behaviours (EEA 2013)

In addition, research, as presented in EEA (2013) also suggests that what is crucially important is the link between measures and behaviour and that technical interventions alone will have a lower impact and are more expensive if carried out without any behaviour-change programme. Behaviour, individually and collectively, is therefore clearly important in the context of energy use and pro-environmental behaviours in organisations. Therefore the question is not if people need to change their behaviour, but how much and how soon they have to act in order to not have a negative impact on the environment.

3.2 Approaches to behaviour change

A range of strategies have been proposed for changing behaviours, which focus on different behavioural determinants (De Young 1993; Gardner and Stern 2008; Jackson and Surrey 2005; Verplanken et al. 1998; Borden and Schettino 1979; Collins et al.

2003). In reviewing the different approaches a distinction can be drawn between antecedent and consequence strategies (Abrahamse et al. 2005). Antecedent strategies aim at changing the factors that happen before the behaviour; for example they can inform about choice option or raise awareness. Examples are information and education programmes, prompting, behaviour commitments and environmental design. Consequence programs aim instead at changing the consequences that follow the behaviour; examples are rewards, feedback and penalties. Another distinction can be made between informational and structural strategies. Informational strategies aim at changing the motivations, perceptions, norms and cognitions of the behaviour, whereas structural strategies aim at altering the conditions under which choices are made (Steg & Vlek 2009).

3.2.1 Informational strategies

First, informational strategies can be designed to increase people's knowledge in such a way to increase their awareness of environmental issues and the implications of their behaviour (Schultz 2002); or they can be aimed at increasing the knowledge of behavioural alternatives (Abrahamse et al. 2005). It is assumed that new knowledge may have the consequence of changing attitudes, which will affect behaviour (Burgess et al. 1998). Although this approach can be very effective when motivation exists and knowledge is the only barrier (Fisher & Irvine 2010), overall studies have shown that this approach has very little and sometimes no impact at all upon behaviour (Blake 1999; McKenzie-Mohr 2000; Lorenzoni, Nicholson-Cole and Whitmarsh 2007). This approach has been used in numerous mass media initiatives in the UK, for example the Going for Green and the Are You Doing Your Bit campaigns (Collins et al. 2003) and is at the base of numerous policies (DEFRA 2008).

Second, persuasion may be designed at strengthening people's commitment to act pro-environmentally, influencing attitudes, and/or strengthening altruistic and ecological values. Commitment approaches have been shown to be successful to some extent in encouraging pro-environmental behaviour change (Abrahamse et al. 2005; Schultz 2000), similarly to individualised social marketing strategies, in which

information is personalized according to the requirements, desires and perceived barrier of different segments of population (McKenzie-Mohr 2000; Thogersen 2007; Peattie and Peattie 2009; Corner and Randall 2011). However, the social media marketing approach works at the individual level, but it is unclear if the targeted messages hold their effectiveness in the context of social interaction (Corner and Randall 2011).

Third, social support and role models are offered to strengthen social norms and to educate people about the perceptions and behaviour of others; this system appears to be effective in supporting pro-environmental behaviour (Schultz et al. 2007; Lehman & Geller 2004). Informational strategies have been proven to be mainly effective when pro-environmental behaviours are moderately convenient and not too costly (in terms of time, money, effort and/or social disapproval) or in situations when people do not face strong external limitations on behaviour. In addition, informational strategies can also be an important component in the application of structural strategies that foster individuals to change their behaviour. For example, public support for structural strategies may be amplified by educating individuals about the necessity for the process and the possible consequences of such strategies (Steg & Vlek 2009). However, besides presenting information to people, it is mostly important to listen and engage the public when creating and implementing environmental policies, for example through public participation (Gardner & Stern 2008) as discussed in section 3.3.

3.2.2 Structural strategies

When behaving pro-environmentally is costly or difficult because of external barriers, changes in the external conditions may be needed to increase the opportunities of individuals to behave pro-environmentally and to render pro-environmental behaviour choice more attractive (Thøgersen & Ölander 2003; Crompton & Thøgersen 2009; Stern 1999). As such structural strategies aim at changing the context in which behaviours occur, but might also have the indirect effect of changing perceptions and motivational factors; e.g. attitudes regarding organic food might

become more favourable after a price reduction (Steg & Vlek 2009). Benefits and costs of behavioural alternatives can be affected through different approaches:

9. The convenience and quality of certain products or service can be changed by transformations of the technical, physical or organisational context (e.g. closing the city centre to motorised traffic or providing pro-environmental technological solutions or recycling bins);
10. Legal regulations can be applied;
11. Tax and incentives systems can be implemented with the aim of decreasing the price of pro-environmental behaviours and/or of increasing the cost of non-environmental alternatives (Frey & Stutzer 2006). There are successful examples of the effectiveness of the price system: the Environmental Levy Plastic Bag in Ireland (Collins et al. 2003), the London Congestion Charge fee or the smoking ban in the United Kingdom (Ockwell et al. 2009);
12. The shared social practices in which behaviour occurs can be altered (Shove 2010); in this approach behaviours are considered to be the observable expression of social phenomenon, rather than the expression of individuals' attitudes and values; as such they are just the 'tip of the iceberg' of the larger context of practices (Spurling et al. 2013), as such it is necessary to shift the focus away from individual responsibility and instead concentrate on the role of governments and other institutions in creating the conditions for practices of daily life.

Structural strategies often aim to punish bad behaviours or reward good behaviours. Rewards have shown to be a more effective approach at encouraging pro-environmental actions (Geller 2002); however, the change in behaviour in the context of tax and regulation is affected by the tax itself, rather than by the reasons that lie behind it (Dobson & Bell 2006). When the regulation system is removed, in fact, it is expected that people will return to their previous behaviour (Dobson 2003). Secondly, it is argued that the environment and the natural world have rights of their

own and belong to the next generations as well as the present; as such today`s society does not have the right to establish a system of price for the use of the environment (Naess & Kumar 1992).

3.3 Public participation, environmental citizenship and behaviour change

Environmental problems are complex, uncertain and affect multiple actors on a range of scales. As such, the fair management of environmental issues demands transparent decision-making processes that are flexible to the changing circumstances and embrace different knowledge and values. Since the 1960s, public awareness of environmental hazards has grown and communities have started demanding explanations of the risks present in their region and what will be done. Increasingly, communities are no longer satisfied to leave decisions about the environment and their health to the government and scientific experts. To resolve this, participation is increasingly being embedded into environmental decision-making, from the local to the international scale (Stringer et al. 2007), for example in urban planning and policy formulations.

According to Habermas, participation can offer a solution to social risk conflicts by creating consensus among responsible citizens thanks to communicative rationality and reasoning (Habermas 1984; Habermas 1987). In addition to these normative arguments in support of participation, many instrumental reasons have been claimed for participation: the establishment of a new relationship between expert and lay comprehending about a topic (Petts 2006).; making specialised knowledge widely understandable and translating concrete and everyday problems and concers into an expert dialogue; the appreciation of the experience of laypeople, expecially in the context of local issues. Also, it is claimed that by involving different people the durability and quality of decisions is likely to be greater (Fischer 2000).

3.4 Public engagement

Arnstein stated that *"citizen participation is a categorical term for citizen power"* (Arnstein 1969, p.216). It is in fact a reorganisation of power that allows citizens that are normally excluded from the political process to be deliberative in the future.

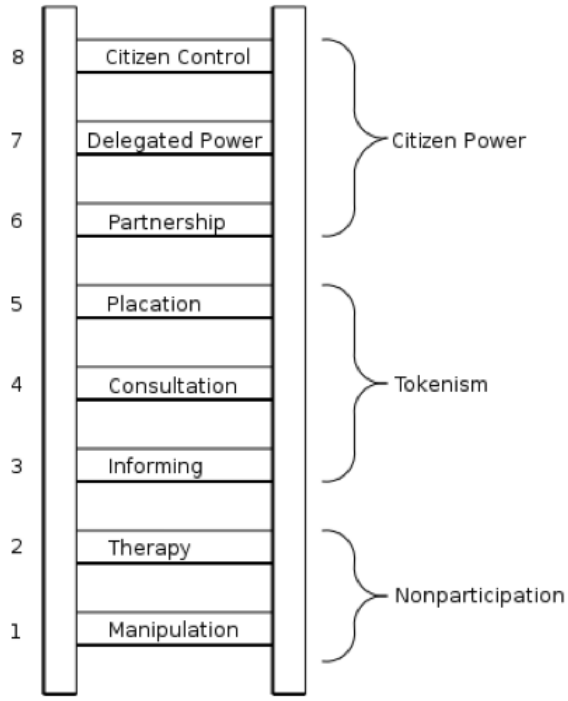


Figure 3. Eight rungs on the ladder of citizen participation (Arnstein 1969)

In Figure 3 eight levels of participation are presented as they are defined by Arnstein. The real aims of the first two rungs are not to engage the public in a decision-making process, but only to 'educate' or 'cure' them and to secure people`s support for future planning (Few et al. 2006). The third and fourth rungs are levels of *tokenism*, because they let the public have a voice and listen, but they do not give them the power and the certainity to be heard by the power-holders. *Placation* too is a rank of tokenism, because the lay public to have the right to give advices in the process, but the power-holders mantain the privilege to make decisions. Beyond these levels participation is finally real. *Partnership* enables the public to negotiate with established authority-holders. The *Delegate Power* means that lay citizens have at least some seats in the decision-making process and authentic power. In the last rung are considered processes of *Citizen Control*, such as for a school or a neighborhood. In

this way people have the power to influence and manage the administration of a program or an organisation. Through this model, Arnstein not only tries to argue for the involvement of the excluded in the democratic system, but she also questions the very foundations of the system.

Grounded in Habermasian theories of the `ideal speech situation` and of communicative competence, the three theoretical principles for public engagement are fairness, competence and social learning (Webler et al. 1995). Competence is increased if local and lay expertise is involved in the process and when professional knowledge is publicly tested. The process and its outcome are more impartial if the different potentially concerned groups have equal chances to influence the outcome. But what is also very important is that *"when citizens become involved in working out a mutually acceptable solution to a project or problem that affects their community and their personal lives, they mature into responsible democratic citizens and reaffirm democracy"* (Webler et al. 1995, p.444). Social learning is therefore one of the greater outcomes of a deliberative process.

3.4.1 Webler's principles for a public engagement process

- Fairness

Fairness refers to the possibility of any affected group to adopt an authentic position in the decision-making process. For example, participants should have equal opportunities to attend meetings; they also must have the opportunity to freely initiate discourses and to equally participate in the discussion. Participants must have the possibility to contribute in the decision-making; this means that everyone should have the same opportunity of influencing the ultimate outcome of the process.

- Competence

Competence relates to the capacity of the procedure to achieve the best decision possible, starting from the knowledge considered essential at the time the process is held. This means that people need to have easy access to all the relevant information

from all the interested parties and that they are given the time to analyse the given information and to express their opinions and concerns.

- Social learning

With social learning it is intended that the process enables participants to develop new knowledge and in which they learn to perceive their personal concerns in relation with the collective ones. There are two the main components of this process: `cognitive enhancement` and `moral development`. The first term refers to an increase in knowledge for all the involved parties. The second refers to the process through which participants become more competent to make evaluation about what is right and what is not.

3.4.2 Relationship between expert and lay knowledge in a public engagement process

Traditionally knowledge flows from the scientists to the public. However, communication is not only a simple process of transferring knowledge, but also an on-going and bidirectional process of learning.

The difference between expert and lay knowledge is that the former one is considered to be scientifically-based, hence demonstrable and tested, whereas public knowledge is based on common sense and therefore it is considered to be hypothetical (Petts & Brooks 2006). Moreover expert knowledge is institutionalised and usually subject to peer-scrutiny, whereas lay knowledge is collective and casually and naturally distributed among parties and communities (Irwin et al. 1999). Sovacool (2014) for example notes that non-experts are often more attuned to the ethical issues of a situation.

In the context of risk management, it is fundamental that experts provide their technical expertise, with particular attention on focusing on the uncertainties and on the different perspectives. In the context of waste management, for example, zero risk cannot be achieved and several uncertainties exist; therefore it is central to

create a relationship of trust between lay people and policy makers and experts through the establishment of an open debate.

In the next section, an in-depth look at the characteristics of social learning will be given.

3.5 Social learning

Social learning is considered to be the third component of public engagement, but also an important outcome of a participatory process (Bull et al. 2008; Petts 2001; Petts 2006; Webler et al. 1995; Tippett et al. 2005). What is key is that learning that is created within the process extends beyond the length of the engagement. With social learning it is intended the process in which participants not only achieve new knowledge, but they also learn to perceive their personal concerns in relation with the collective ones.

3.5.1 Social learning, communities, organisations and behaviour change

Habermas`s theories explain that social change is a process of social learning; human societies can learn to change to adapt and mitigate the effect of health and environmental problems (Habermas 1979 in Webler *et al.* 1995). Bandura also investigated how the learning process in individuals is dependent on social interaction (Bandura 1971; Bandura 1986; Bandura 1991).

In addition, the process of social learning happens within the participation process group but can also expand beyond it; as Bull *et al.* (2008) observed, *"for some, participation has gone on to affect their social networks, colleagues and neighbourhoods"* (Bull et al. 2008, p.712). The success of a participatory process depends also on what the people outside the process in the interested community perceive, because not all the concerned parties can be personally involved in the process (Webler et al. 1995). Evaluating the impact and trace of the complex interactions among the people who participate and the people who do not is a

complex process, but it is one of the important outcomes of the participatory process itself.

Participation may be essential to encourage social learning, because it is in the interaction of different parties that social learning occurs (Tippett et al. 2005). Social learning, however, is not a certain and automatic result of the process. Providing sufficient time and resources, fostering interaction between stakeholders, supporting transparent communication, and building an environment of trust, transparency, respect, and openness are key factors that support social learning (ibid.).

Learning can be instrumental, which is the acquisition of new knowledge or skills, communicative, when new knowledge is acquired through communication with others and transformative, where the examination of knowledge leads to a change in attitudes, social norms or behaviours. For social learning to occur therefore, a change in understanding must be demonstrated by the individuals involved (Reed et al. 2010).

3.5.2 Learning within communities and organizations

Learning is not confined to individuals though, but also organizations (White et al. 2005). The type of learning is different: whereas individuals acquire knowledge in the form of concepts and ideas, organizations and communities learn routines, dialogue and symbols (Blackler 1995). This literature argues that communities develop a shared perspective of the world, also called “group-thinking” (Janis 1989), and it supports the idea that collective learning can achieve better results than the aggregation of individual learning (Wals 2007; Armitage et al. 2008), as demonstrated by studies of organizational learning and of the “wisdom of crowds” (Surowiecki 2005). Social learning theory and practice have been applied to the concept of learning citizenship, starting with the idea that citizenship can be better learned through positive experiences and active involvement in society rather than in a formal curriculum of studies (Wildemeersch et al. 1998; Benn 2000). To be considered social learning, the process must exhibit a change that goes beyond individuals and small groups, but it is situated within a wider community. This said, it is difficult that

groups composed by researchers can correspond to natural communities, so for social learning to occur, the ideas and attitudes learned during the participatory process must diffuse outside the interested group to the wider communities participants are member of (Reed et al. 2010).

3.5.3 Learning through social interaction

Social interaction is key to the development and achievement of social learning and change. For example, a mass media campaign can be considered successful in achieving a societal change through social learning only if the message spread from one person to the other through their social networks. The social networks of a person can strongly influence his opinions and views regarding an issue (Friedkin, 2006; Hunter, Vizelberg, & Berenson, 1991; G. F. Network, 2012; Stevenson & Greenberg, 2000; Winter, Prozesky, & Esler, 2007 in Reed et al., 2010). Influence within social networks can happen on a one-to-one basis, or it can be the result of a larger network in which actors are embedded (Coleman & Coleman, 1994; Prell, Reed, Racin, & Hubacek, 2010; in Reed et al., 2010). Learning can happen through two types of social interactions: (1) information transmissions, that is the simple learning of new facts and (2) deliberation, i.e. the genuine exchange of ideas and opinions during a conversation where perceptions and ideas change thanks to persuasion. Through this latter form of social interaction, which is grounded in Habermas theory of communicative action, it is possible to say that social learning can lead to changes in social network and wider societal and institutional structures (Reed et al. 2010).

3.6 Democracy, participation and governance

Environmental citizenship is strongly characterised by the active participation of citizens in a transition towards sustainability. Demanding citizenship to reflect the nature of contemporary environmental issues, it asks a shift toward governance in environmental policy and politics, rather than simple government (Dobson 2010). The central question is what is the role of communities, governments, and businesses in

building the conditions for environmental citizenship. The following are the processes that can foster it:

13. Provide more opportunities for citizens to participate in environmental decision-making regarding local issues (Dobson 2010).

Different studies have demonstrated that participating in local groups involved in pro-environmental activities can enhance environmental citizenship behaviours. For example, Seyfang (2006) analysed the relationship between participating in local organic food networks, sustainable consumption, and environmental citizenship. She discovered that the food network not only had an influence in developing better informed and educated communities around food, but it was also able to nurture the ethics and values of environmental citizenship and to make their expression feasible. Participants were behaving as 'good ecological citizens' proving environmental citizenship to be a valuable theoretical model for behaviour-change in this context (Seyfang 2006).

14. Build more opportunities for volunteerism and civic engagement (Dobson 2010).

Volunteering and citizenship-based activities can be time consuming, as such according to Dobson citizens that wish to be engaged in such activities need to be supported. For example, employers, with the support of national Governments, should implement career advancement, shorter working week, and access to affordable childcare for those who participate in community-based initiatives.

15. Environmental education (UNESCO 1977; Bell 2004; Dobson 2010).

As stated in the Intergovernmental Conference on Environmental Education run in Tbilisi in 1977, three are the main goals of environmental education: (1) To promote clear awareness and concern of economic, social, political and ecological interdependence in both rural and urban areas; (2) To grant every individual the opportunities to gain the knowledge, attitudes, commitment and

skills necessary to protect and improve the environment; (3) To create novel behaviour practices for individuals, groups and society towards the environment (UNESCO 1977). For many, the creation of 'green citizens' who will exercise their democratic power and the creation of 'green consumers' who will exercise their financial power to protect the environment is the only solution to our environmental issues and this could be achieved through environmental education (Bell 2004). Others instead question that environmental learning should be rather active, than passive, as for example by giving more opportunity for participating in local decision-making and in fostering the creation of local communities (McKenzie-Mohr 2000a; Cooper et al. 2007; Dobson 2010).

3.6.1 Critical review of environmental citizenship and the potential for behaviour change

A successful process of engagement is predicated on an ideal dialogue between lay people and experts, which lead to a process of learning of all participants. The open question is whether this process can lead to a long-term learning, and not only be confined to the public engagement process in itself (Bull et al. 2008). In a study about the components of environmental citizenship Hawthorne & Alabaster (1999) show that although participation accounts for very little of the variation in behaviour, learning through participation is the most important component in the prediction of pro-environmental behaviour (Hawthorne & Alabaster 1999). As already cited, Webler *et al.* (1995) state that when citizens become involved in working out a mutually acceptable solution to a problem that affects their community *"they mature into responsible democratic citizens".*

It is argued that today society`s dominant paradigm is anti-environmentalist (Pirages & Ehrlich 1974 in Dunlap *et al.* 2000). As such, environmentalism is a challenge to our fundamental views about nature and humans` relationship. In the traditional concept of citizenship individuals have civil, political, and social rights. In this vision the environment is simply conceived as a property (Bell 2005). In contrast, for the environmental citizen the conception of the environment as a mere property is

incomplete, because it does not recognise the essential role of the ecosystem in providing individuals` basic needs.

3.6.2 What is environmental citizenship?

> *"Environmental citizenship is a personal commitment to learning more about the environment and to taking responsible environmental action. Environmental citizenship encourages individuals, communities and organizations to think about the environmental rights and responsibilities we all have as residents of planet Earth. Environmental Citizenship means caring for the Earth"*
>
> (Environment Canada 2004 quoted in Bell 2005 p. 181)

Environment Canada introduces the idea of rights and responsibilities and the vision that people are carrying those 'as residents of planet Earth', therefore suggesting that the environment is a novel political community (Environment Canada 2004).

Bell (2005) suggests that environmental citizenship asks people to act in a different way from the current norm for the sake of the environment; it is "*an attempt to make environmental conservation and sustainability an important duty of citizenship that citizens all over the world should be aware of*" (UNEP 2002).

The concept of environmental citizenship involves looking beyond the satisfaction of immediate interests to the health and safety of the wider community, and being simultaneously attentive of the needs of future generations (Barnett et al. 2005). It can be considered a way of promoting ecological sustainability and environmental justice, following a direction that is opposed to the current dominant model within the government (Dobson 2010). In this model individuals are not solely consumers, but key players in the making of sustainable development (Hobson 2002; Dobson 2010).

The main components of environmental citizenship are (Barnett et al. 2005):

1. The first element is *private responsibility*, which involves an emphasis on the importance of individuals' personal actions.
2. The second factor is *environmental justice*, which emphasises collective action to pursue certain rights, such as clean air and water, a liveable environment, etc. and challenges the existing inequities. Dobson (2003) places justice at the core of environmental citizenship, as its first virtue and first duty (Luque 2005).
3. The third component is *collective action*, which involves individuals behaving as members of a public community, accepting collective responsibility for actions, rather than acting as private individuals (Barnett et al. 2005).

3.6.3 A ladder of environmental citizenship

An early definition of environmental citizens described them in the following way: being educated about environmental issues, having awareness and concern for them, and showing to behave in an environmentally responsible way (Hawthorne & Alabaster 1999). Bell (2005) notes that environmental citizens appear to be people who voluntarily decide to care for the environment. According to Irwin (2001) 'scientific citizens' are citizens who are scientifically educated, hence environmental citizens are citizens who are concerned about the environment. MacGregor & Szerszynski (2003) propose that in this perspective, citizenship is put at the service of the environment, although Bell argues that is human behaviour that is at service (Bell 2005).

The environmental citizens' life might be somewhat diverse from the life of the average citizen. For example, they will *"turn off the tap when brushing [his] teeth or washing his face'; 'walk, ride [his] bike, carpool or use public transport when possible'; 'shop at second-hand stores and garage sales … instead of purchasing brand new items'; 'help protect and conserve that part of the local ecosystem where … he belongs … and participate actively in local environmental affairs in cooperation with government and others"* (Environment Canada 2004 quoted in Bell 2005 p. 179).

Dobson identifies six main characteristics of the environmental citizens (Dobson, 2010):

1. The environmental citizen believes that environmental sustainability is a common good which is not achievable if individuals pursue self-interest alone.

The environmental citizen understands in fact that what it is good for him/her as an individual might not be good for society. The environment is understood as a *'common-pool resource'* (Dobson 2010); as such no one can be prohibited from using it; however it is a finite resource. The issue is why anyone would make an effort to conserve the common good, when they will have the same benefit without the additional effort. The response might be that environmental citizens are committed to the common good, as it is suggested by a Swedish study about the motivation for pro-environmental behaviours in households (Berglund & Matti 2006).

2. Other-regarding motivations as well as self-interested ones move the environmental citizen.

> *"The citizen that sorts her garbage or that prefers ecological goods will often do this because she feels committed to ecological values and ends. The citizen may not, that is, act in sustainable ways solely out of economic or practical incentives: people sometimes choose to do good for other reasons than fear (of punishment or loss) or desire (for economic rewards or social status). People sometimes do good because they want to be virtuous".* (Beckman 2001, p.179)

In contrast with the 'rational-actor' model, environmental citizenship is operated following what Kollmuss & Agyeman (2002 p. 244) call "*models of altruism, empathy, and pro-social behaviour*", where pro-social behaviour is defined as "*voluntary intentional behaviour that results in benefits for another*" (ibid.). Moreover, too often individual behaviour is conditioned by what others do. The reciprocity argument is

central in the 'I will if you will' report by the Sustainable Development Commission (SDC 2006). The issue is that citizens might not feel obligated to do their part because they do not trust the government or other citizens to do the same. Instead the environmental citizen will say '*I will, even if you won't*' (Dobson 2010), voluntarily accepting the responsibility of acting for environmental sustainability.

3. The environmental citizen believes that other than techno-scientific knowledge, also ethical and moral knowledge are important in the perspective of pro-environmental behaviour change.

Knowledge is a pre-requisite to action, as different studies have demonstrated (Borden & Schettino 1979; Hines et al. 1987; Bartiaux 2007) but it is not sufficient and must be combined with the desire/motivation to act and the ability to act (Hawthorne & Alabaster 1999). However, also ethics and virtues occupy a key role in the practice of environmental citizenship. As Ashley (2000) suggests, it is improbable that knowledge without values will lead to behaviour change, because the reason for action is principally associated with values. The virtuous citizen makes judgments on the basis of both ethical and scientific knowledge.

4. The environmental citizen believes that he has a responsibility to redeem other people's engendered environmental rights.

As already stated, environmental citizenship attaches a greater importance on duties than on rights and on "a public morality of duty and obligation" (Ashley 2000, p.133). Traditionally a mutual relationship exists between rights and duties; citizens can claim several rights against the state, which are then made true in return of the execution of different duties. In environmental citizenship this relationship is partly different, because more than the vertical relationship between the citizens and the state, it is important the horizontal connection between fellow citizens. Therefore the link between rights and duties is more about the rights and duties of one citizen with the other citizens (Dobson 2010).

5. The environmental citizen believes that responsibilities are owed not only to people that are close to him, but also to distant strangers (who might be distant in space, but also in time).

Environmental citizens have duties and responsibilities that are international and intergenerational (Dobson 2007); this is due to the fact that they are constantly using resources that come from beyond the national boundaries. Environmental citizenship is a cosmopolitan citizenship, therefore citizens identify with the whole humanity, rather than with fellow citizens territorially defined. Moreover, environmental citizenship is not defined in terms of membership, but of participation and activity in the life of the community (that, in this case, is the whole humanity) (Dobson 2010).

6. The environmental citizen is aware that his private environmental actions have public impacts that are environment-related.

This is argued on the premise that because environmental issues are caused by the aggregation of our singular, individual actions, everyone has to change his behaviour if he wants to change the situation (Dobson 2007; 2010; 2004). This is however one of the most controversial statements (Neuteleers 2010). Derek Bell in fact argues that as citizens we only have a duty to support institutions (Bell, 2004, 2005). He states that the liberal citizen can endorse two kinds of private duties: first, private pro-environmental actions may be the way of stimulating just arrangements (e.g. being the sign to government that there is popular support for a law); second, there might be some private environmentally activities that a liberal state could not require citizens to do by law but could proclaim to be 'citizens' duties'. A liberal state cannot in fact limit the freedom of its citizens.

Dobson instead argues that private activities have a heavy and real public consequences on the environment (Dobson 2010). To support this it can be said that private houses are responsible of the 42% of UK carbon emissions from energy use, for example (DEFRA 2008). Moreover, Dobson says that many good environmental practices and habits can be learnt at home, making the private sphere again crucial for environmental citizenship (Dobson 2010).

Following these characteristics a ladder of environmental citizenship has been created (Figure 4), which elaborates the different levels of achieving environmental citizenship, following the example of Arnstein's ladder of participation. The ladder will be used to compare participants in Chapter 7. The sense of citizenship and willingness to act is increasing as one goes up in the ladder.

Figure 4 A ladder of environmental citizenship from Pianosi et al. (2014) based on Stern and Dobson(Stern 2000; Dobson 2010)

Environmental citizens are morally guided by the aspiration to do and ensure justice (Dobson 2003, p.122ff). Therefore, since they live in the richer part of the world, they are very likely to transgress their fair share of ecological space, which leads them to feel responsible to compensate or remedy for their high impact (Jagers 2009).

The base line for environmental action is the belief that climate change is happening and is human made (Horton 2005; Wolf 2011), however, there is still uncertainty about the reality and seriousness of climate change among the public. Polls of public attitudes have documented an increase in the perceived uncertainty about anthropogenic climate change over the past years (BBC 2010; PewResearchCenter

2009; Spence et al. 2010); feeling a sense of responsibility for compensating actions can only derive from being aware of the inequality. As found by Seyfang (2006), there is a correlation between being involved in environmental, humanitarian, or cultural organisations and the willingness to act as a responsible citizen, therefore it is considered as the second level of engagement. Involvement is defined as an investment of either time or money, or both. This criteria is based on the Aristotelian belief that citizenship is about political activity and participation, rather than a passive reception of entitlement, as liberalism has established in recent decades (Dobson 2010).

The third rung considers the concern for the effect of climate change and is tied to the concept of justice. Having environmental concern is considered one of the primary characteristics of environmental citizens (Dobson 2010; Hawthorne & Alabaster 1999).

The fourth rung is the willingness to pay taxes for environmental purpose; this is connected with the idea that environmental citizens, being aware of the inequality in the use of space and resources, are willing to compensate for this even if it inflicts costs on them. And it is possible that part of this compensation will be collectively organised by the government and therefore funded by taxes (Jagers 2009).

All these factors, however, do not causally determine pro-environmental action; people might be aware and concerned about the effect of climate change, might be active citizens and happy to pay their part of environmental taxes, but still do not take action individually to compensate their part of environmental injustice. Many are the barriers in place (Lorenzoni et al. 2007b), many the physical constraint (Shove 2010) and many the norms and habits to break (Dahlstrand & Biel 1997; Stern et al. 1999). However, the actual environmental citizen is the one that personally behave as to have the lowest impact possible on the environment (fifth rung).

Taking an holistic approach and seeing the interconnection between human beings and the natural environment is seen as a higher degree of environmental

consciousness; this criterion takes into account the non-territorial and non-reciprocal notions of environmental citizenship, where responsibility is held to people and place distant not only in space, but also in time (Dobson 2003, p.82ff). This is rooted in a sense of interconnectedness among individuals (Wolf et al. 2009).

The highest rung is devoted to one of the purest act of citizenship (Dobson 2007), which is nonetheless often neglected in modern societies; the environmental citizen is in fact an active citizen and ask for a change in policies for environmental justice both through his activities offline and online. In the context of environmental citizenship, this often mean being an 'activist', that is, being active in asking for change. Activism has however taken different forms in recent years thanks to the Internet; many are in fact the websites that offer the possibility to sign petitions or to send email to government officials. People have therefore turned into 'cyber-activists'[1].

3.6.4 Environmental citizenship and climate change

It is clear that a rationalistic approach to climate change has not worked (Dobson 2007), therefore a different and 'voluntarist' approach to change attitudes and behaviours ought to be explored. And this different approach can be environmental citizenship, according to different researchers (Jelin 2000; Hayward 2000; Wolf et al. 2009; Dobson 2010). However, what Dobson suggests is not to operate environmental citizenship as a substitute of existing regulatory and fiscal measures, but as a mean that is complementary (Dobson 2010). The positive aspect of fiscal measures is the rapidity of change in behaviour they can promote, as demonstrated by multiple studies (Collins et al. 2003; Frey & Stutzer 2006; Ockwell et al. 2009). However, because most citizens respond to fiscal prompts, but not to the principles that triggered them, there is always the possibility that people will revert to their

1 As defined by Wikipedia Internet cyberactivism is the use of electronic communication technologies such as social media, especiallyTwitter and Facebook, YouTube, e-mail, and podcasts for various forms of activism to enable faster communications by citizen movements and the delivery of local information to a large audience. Internet technologies are used for cause-related fundraising, community building,lobbying, and organizing. (definition from http://en.wikipedia.org/wiki/Internet_activism)

previous behaviour if the tax/incentive is removed. Dobson therefore argues that fiscal measures can change behaviours, but only at a superficial level and that it could be beneficial to combine it with environmental citizenship, which could result in more long-lasting change (Dobson 2010).

3.7 Social media: a tool for public engagement?

Public engagement principles have been presented in the previous section; it is the interest of the present section to understand how relevant the notion of the 'ideal speech situation' is to on-line activity.

Dahlberg (2001) has attempted to develop a similar set of requirements to assess deliberative activity in on-line forums based on Habermas' theory of communicative competence. Despite the fact that it is difficult to draw substantial conclusions, Dahlberg concludes optimistically, that, whilst these fora are still reaching a minority audience, if carefully managed and promoted, they do have a future.

This on-line revolution is also acknowledged by Krimsky (2007) who offers a cautionary account on the role of the Internet in risk communication in terms of determining truth claims on-line. Recognising the 'information revolution' that has taken place, Krimsky notes that the balance of power is finely in the balance between government and corporate agendas *vis a vis* public misinformation and scare-mongering over risk.

The testing of truth claims is of course the very purpose of analytic-deliberative risk communication and public engagement. A successful process of engagement being predicated on an ideal of dialogue as a means to '*induce reflection upon preferences in a non-coercive fashion*' (Dryzek 1990; Dryzek 2000) and drawing upon the knowledge of all members of a community (Healy 1992). Practically this means that through the interactions between a diverse group of individuals, lay and experts in particular, knowledge and ideas can be tested, verified and challenged with impressive results (Irwin 1995; Wynne 1996; Bull et al. 2008). Increasingly, links are made between public engagement and learning, increased environmental citizenship

and behaviour change (Bull et al. 2008) and is this potential link, and its translation to on-line engagement, that this research set out to address.

Table 4 presents a summary of the common characteristics between public engagement processes and social media.

Public participation processes	Social media
Bottom-up approach	Bottom-up phenomenon
Citizen knowledge	Everyone can participate and create content in the online discussion
Access to information	Everybody has access to `instant` information. The `linking` mechanism makes easier for people to know new ideas or movements
Equality in the process	Information is shared without geographical and demographical constraints
Information (or knowledge) can spread outside the participatory group	Information can easily spread outside the group of `friends`
The process facilitates the dialogue between different stakeholders and between experts and lay people	The possibility of adding comments transform information into an interactive dialogue (online journal papers for example)
The process is an enhancement of democracy	Social media have been used to ask an enhancement in democracy
Social learning is an outcome of the process	People share information with `friends` and `friends of friends` or even strangers on social media. This process has an influence on personal knowledge and behaviour; although it cannot be considered as a proper social learning process

Table 4. Common characteristics of public engagement processes and social media

The need to further explore the potential of social media tools is self-evident, and particularly the need to locate such claims into specific contexts.

3.7.1 The rise in digital communication

The term Web 2.0 was first used in 2004 to describe how software developers and ordinary users were using the Internet: decentralisation, user-focused and user-led (O`Neill & Boykoff 2011). Kaplan and Haenlein (2010) note that whereas Web 1.0 was characterised by content and applications produced by individuals or organisations by a top-down or expert-led agenda, Web 2.0 saw the creation of material being

"continuously modified by users in a participatory and collaborative fashion" (Kaplan and Haenlein, 2010, p. 61).

People are no longer confined to accessing the Internet via personal computers as changes in smartphone technology have transformed communication. Currently 65% of the UK population use smartphones (Statista 2017b) and this is expected to rise to 80-90% before 2022 (Google/MMA 2012). The modern smartphone is able to connect to the web, has access to social media sites, has a camera (often with video capability), a global positioning systems (GPS), and is able to send emails and text messages. They can gather data as well as share it instantly. In addition there is a large number of applications ('apps') designed to run on smartphones. Smartphones have shifted the boundaries between each other and through the opportunities that the digital technologies affords. This is particularly evident in the rise of social media.

3.7.2 A ladder of e-participation

In a parallel with Arnstein ladder of participation, Ferro and Molinari (2010) have developed a ladder of e-participation within United States' society mapping the level in which people participate and contribute online and noting that people can move from being inactive, to being active, but also becoming creators (see Figure 5).

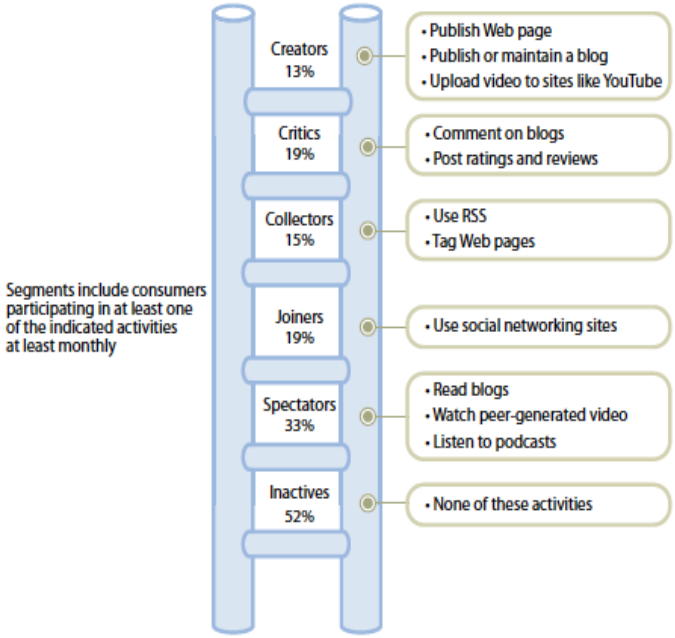


Figure 5 The ladder of e-participation (cited in Ferro and Molinari (2010)

Only a small part of the online population are *Activists*, in the sense that they spend time creating content on personal blogs and wikis and responding to calls of different nature (political, economical, etc.). 19% of Internet users are *Socialisers*, they create and animate online communities and social networks. The *spectators* instead do not have interest in participating in Web 2.0 activities, probably due to lack of time and also concerns about privacy and security of personal data. The bottom part of the ladder is comprised of the *Unplugged*, who are the ones that do not take part in any of this activities.

3.7.3 Community action on social media. Is it real?

There is extensive literature that covers these theme; as such this research will only present a selection. Three main topics came up from the literature review:

1. Scepticism about the fact that the widespread use of social media can have long-term benefits on society. This is due for some authors to the effect of Internet corporations on democracy (McChesney 2013), for others to the cultivation of consumer-citizen (de Zúñiga et al. 2014). For

example, (Roberts 2014) explored the degree in which Internet users have *"become transformed into subjects of online consumption and orderly surveillance, rather than committed social and political campaigners"*. On the other hand, he still provide an optimistic perspective of the use of social media claiming that *"new media helps to empower those who privately hold oppositional views to a government regime and then translate these into public expressions of opposition"* (Roberts 2014, p.159). Facebook is the perfect example of the consumer-citizen creation as individuals are considered only as consumers and for being able to provide insights into friends, family and acquaintances (Portwood-Stacer 2013). In addition to this, Facebook "*monetizes most effectively those who enterprise themselves"* (Skeggs & Yuill 2016, p.391) taking away the deep meaning of content creation and participation.

2. Investigation into collective action and the way its nature is being transformed and redefined as a new way of 'doing politics'. In this context there is a debate between 'collective action' (Kreiss 2015) and 'connective 'action' (Bennett & Segerberg 2011). The dispute emphasizes the existing conflict between the expression of collective identity and networked individualism with the concern that using personalised communication might eventually weaken the efficacy of collective action because when analysing large-scale campaigns, Bennett & Segerberg (2011) found that "*some of these protests seemed to operate with surprisingly light involvement from conventional organizations*". Another theme related to this, is what has been called '*clicktivism*' or '*slacktivism',* that is the idea that contributing to collective action through social media is 'too easy' and as such it devaluates true activism (Sormanen & Dutton 2015).
3. The use of digital technologies to offer an alternative expression to the government. For example, as a way to organise rapidly protests and mass actions and to create horizontal networks rather than vertically controlled ones. A research on political activism on social media performed in Greece

> and Sweden observed that images that resonated with the platform were used against the system (Galis & Neumayer 2016). Social media assume a role for independent individuals in broadcasting what they, or other witnesses, saw and share the experience directly and globally (Greenwood & Levin 2000).

Following the US presidential elections and the EU referendum in the UK, social media have been recently accused to have a role in the disorder around democracy. From the blame placed on Google and Facebook for their role in the dissemination of 'fake news' during the US elections, to the disillusion with online petitions (Hyde 2015) there are questions about the democracy of digital media (Manjoo 2016) and their role and power in creating community of action.

3.7.4 The use of social media for behaviour change

Groups like the American Red Cross (Briones et al. 2011), the UK based Forestry Commission (Stewart, Ambrose-Oji et al. 2012) and business leaders (Fischer & Reuber 2011) are all using social media, especially the micro-blogging site Twitter. Most recently, there are encouraging examples of social media being used for behaviour change within energy and buildings (Foster et al. 2012; Foster, Blythe, et al. 2010; Crowley et al. 2014; Burrows et al. 2013; Piccolo & Alani 2015). Persuasive technology, a term coined by B.J. Fogg, is defined as "*Technology that is designed to change attitudes or behaviours of the users through persuasion and social influence, but not through coercion*" (Fogg 2009). There is an extensive set of literature on the design and evaluation of applications aimed at changing energy behaviours in the domestic environment (He et al. 2010; Fischer 2008; Riche et al. 2010; Chetty et al. 2008) with some success (Foster, Lawson, et al. 2010); Foster et al. (2010) in fact discovered that providing energy feedback in a social condition motivate reductions in consumption. Other research are instead exploring the use of persuasive technology in the non-domestic context and have shown that they can be successful in persuading users to change behaviours. For example, Foster, Linehan, et al. (2010) applied the idea of social and competitive interaction over social media to motivate

change in physical activity by measuring daily steps taken with a pedometer. They found out that in the socially-enabled condition, participants significantly increased their step activity compared to the non-social condition suggesting that social media can be a mean to generate positive behaviour change. In another study, Foster et al. (2011) tested adverse energy feedback delivered through Facebook, as such visible to friends and peers. The study was too small to evaluate the effectiveness of this type of feedback, but demonstrated that adverse feedback on Facebook in workplace environment does not lead to participants' disengagement. Another study by Robelia et al. (2011) found that participants' involvement in a community of like-minded people not only increased the average knowledge about climate change of participants, but also motivated them to take additional actions to limit their impact on the environment. Although these interventions have produced promising results, they are still based on a top-down approach where the 'experts' try to modify and change behaviours of the users instead of listening to what users think is important and empowering them to take action.

Other studies have been using social media as a feedback system for behaviour change in the non-domestic context; for example Crowley, Curry and Breslin (2014) used Twitter as a communication medium with building users prompting them to respond to some requests about energy consumption. This resulted in a reduction in energy use of the 26%, according to the researchers, which is a very positive result. On the other hand, the study did not explore the whole potential of social media and the possibilities that result in increased participation of users with buildings management.

Other research attempted instead to take a collaborative approach to the issue of energy management in the context of local authorities (Bull 2014; Bull et al. 2014) with the intention of offering building users the possibility to collaborate and participate. Findings showed that participation *can* improve energy management, although many barriers exist due to lack of individualised controls and competing job priorities and business goals. Piccolo et al. (2014) implemented a study to promote

online engagement about energy in the workplace; results showed that engagement was driven not only by intrinsic motivations, but the greatest motivational force of engagement was found to be the social context. Another study by Piccolo et al. (2014) used instead the EvidenceHub[2], a collective intelligence tool used for community deliberation, to provide public and tangible feedback in a university department with the aim of motivating engagement with energy issues.

3.8 Summary – the research gap

Research into pro-environmental behaviours and sustainability in organisations and institutions is a relatively recent phenomenon. Traditionally, studies about behaviour-change have been performed into the domestic context. This was particularly evident at the beginning of the present research and it still is true as an overall tendency, although studies into organisations and non-domestic buildings have prospered in the last two years. In addition, these research mostly focus on energy-related practices or technological solutions. Interventions that investigate behaviours related with other environmentally significant behaviours (such as transport practice, or food choice, etc.) and that consider the interconnections of these different behaviours are rare. This has been identified as a gap in the literature and it is the reason an environmental citizenship approach to behaviour change was utilised.

The same can be said about social media use for interventions; there was limited research when the study started; now studies have started to flourish, especially from a top-down perspective, as presented in this chapter. However, research to date does not investigate the relationship between users, social media and pro-environmental behaviours. When the impact of social media is analysed a purely quantitative approach is often taken (as it will be show in Chapter 4 and 5), without considering what is the relationship between taking action on-line and behaving in the real world. As such the present research aims to qualitatively analyse how people use social media and how learning is achieved in that context and transformed into knowledge

[2] https://evidencehub.net

and then pro-environmental behaviours. Chapter 4 outlines the research context in which these ideas are explored along with the research approach and methodology.

4 Methodology

This chapter presents the methodology chosen for this study to meet the aim and objectives of the thesis, that is: to *Understand the potential of social media as a vehicle for increasing environmental citizenship and promote pro-environmental behaviour-change.* The chapter is organised in the following sections:

1. Section 4.1 explains the methodological approach of the study;
2. Section 4.2 describes the rationale for the use of a case-study and action research approach;
3. Section 4.3 and 4.4 presents information on operationalising the underlying theory of public engagement and environmental citizenship through the social media campaign;
4. Section 4.5, 4.6 and 4.7 illustrates the implementation of the study and the methods used to collect and analyse data;
5. The final section, 4.8, reflects on the practical and ethical issues of the study and its validity.

4.1 Approaching the real world

Researchers agree that one of the important aspects of any research project is its aim to influence and make sense of our present notions of reality (Gray 2004; Robson 2002; Danemark et al. 2002). What is critical in this process of evaluation and understanding is the connection we make between the real world and the theories formed of it during the research process (Danemark et al. 2002). In other words, the focus is the relation between knowledge of reality (epistemology; e.g. the way people make sense of the world) and the object of knowledge (ontology; e.g. the nature of the world).

The two main, and often perceived as 'antithetical' ontological perspectives, are objectivism and constructivism. Objectivism implies that social phenomena confront researchers as external facts, independent of social actors, whereas advocates of constructivism argue that reality is socially constructed. In constructivist research, the task of the researcher is to develop an understanding of the multiple social constructions of meaning and knowledge.

August Comte was the first to affirm that the social world can be explored in terms of invariant principles like the natural world, establishing the basis of 'positivism', otherwise known as 'naturalism' (Ritchie & Lewis 2003). Positivists argue that the social world exists externally to the researcher and that its properties can be measured directly through observation. Therefore, positivism advocates the application of the methods of natural sciences to the study of social reality (Bryman 2004). The role of the research is to test theories and to provide material for the development of generalised laws.

One of the first to critique this approach was Immanuel Kant, who in his *Critique of the Pure Reason* (1781) argued that there are methods of knowing the world that are different from direct observation. Perception and knowledge, in fact, relate not only to the senses but also to the interpretation of what one experiences through them. This approach, also known as interpretivism, emphasises and values the interpretative aspects of knowing about the social world and the importance and significance of the researcher's own interpretations and understanding of the phenomenon being investigated (Ritchie & Lewis 2003). Arguing that research is never fully value-neutral, interpretivism has particular resonance for the study of people who, unlike objects of the natural world, are conscious, purposeful actors, whose behaviour depends on subjective ideas and meanings (Robson 2002). This central characteristic of humans has implication for conducting research involving people. Behaviour must be interpreted in the light of these underlying ideas, meanings and motivations.

In the context of this research, concerned with how the social and the natural realms interact with each other, an approach is required that integrates the natural and the social sciences. To respond to the environmental problems of today's society it is essential to understand the complexities of the natural world. Social phenomenon, such as the politics of food and the environment, of animal rights, of welfare and of health and wellbeing cannot escape the complex web of biological, chemical and physical interactions (Benton 1991 in Carolan 2005). One of the main problems is that many of the social and natural effects of modernity are beyond direct perception, therefore making them distant from us and from direct observation (Carolan 2004).

Critical realism reconciles the positivist and the interpretivist approaches (Archer et al. 1998) with a theory that sustains the reality of being in the face of the relativity of our knowledge. The answer of critical realism to the dichotomy between realism and anti-realism is that:

> *There exists both an external world independently of human consciousness, and at the same time a dimension which includes our socially determined knowledge about reality* (Danemark et al. 2002, pp.5–6).

Critical realism acknowledges that researchers can make sense of the 'real world' by means of perception, thought and dialectic, but supports the ontological assumption that there is an objective and knowable material world (Huckle 2004). Bhaskar (1978) differentiates reality in three levels of abstraction, or ontological domains: the empirical domain, the actual domain and the real domain (Bhaskar, 1978 in Danemark et al., 2002). The empirical domain consists of events and things that are experienced directly or indirectly. The actual domain is the place where events take place whether one experiences them or not. The real domain consists of the 'mechanisms' that produce events in the world. It is the empirical domain that contain the 'data' that is possible to study, although they are always theory-impregnated (Danemark et al. 2002).

This approach has implications in relation to the theory of environmental citizenship because it offers a unified approach to the natural and social sciences. In this context it is essential to understand the way in which society is embedded in nature and the different forms that nature takes in specific social circumstances. Critical realism is anti-positivist and accepts a weak social constructivism, rejecting at the same time a strong social constructivism, which denies the material reality of nature. Nature is seen as socially constructed; nowhere in the world it is possible to find a 'first nature' untouched by human influence. At the same time people are always subject to the laws of nature, which are constantly operating in the physical world (Huckle 2004). Nature is not a fixed and permanent element, instead it exists in a state of 'permanence-with-flux' (Carolan 2005). This view of nature is fundamental in a research study focusing on environmental citizenship and in understanding how human behaviour affects the environment.

4.2 Research approach

Reflecting on these philosophical assumptions, the study uses both quantitative (i.e. the data acquired about social media engagement) and qualitative data (i.e. interviews with participants). Although recognising some degree of objectivity and independence from the researcher and the researched (as such being quantitative for some aspects), critical realism is also concerned with understanding the way in which people construct, interpret and give meaning to their experiences. As such, the task of the researcher is to develop an understanding of the multiple social constructions of meaning and knowledge. A range of research methods is available which allow the researcher to acquire multiple perspectives. The research participants are viewed as helping to construct the `reality` *with* the researchers (Robson 2002).

Max Weber argues that the researcher has to understand the meaning of social actions in the context of material conditions in which people live (Weber 1949 in Ritchie & Lewis 2003).

> *Qualitative research is a situated activity that locates the observer in the world. [...] It involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them.* (Denzin & Lincoln 2000, pp.3–4)

In social research, however, there is debate about whether qualitative and quantitative approaches should be combined. Some researchers argue that the approaches are so different in their philosophical and methodological origins that they cannot effectively be blended (Morgan 1998; Smith 1983). Others recognise that there can be benefit in coupling qualitative and quantitative enquiry, provided that the two methods, and the data they generate, can be clearly delineated (Bryman 2004, 1992; Hammersley 1996).

In this research, many of the questions that need to be addressed require measurement of some kind (e.g. to what extent this participant was involved in the online conversation?) but also a greater understanding of the nature and origins of an issue (e.g. what are the reasons and thinking behind his involvement in the conversation?). Both approaches provide a distinctive kind of evidence and used together they can offer a powerful resource to inform and illuminate practice as is explained in Table 5.

Understanding behaviour-change in the organisational context **Contributions of qualitative and quantitative methods**		
Functions of research	**Qualitative methods to explore/understand**	**Quantitative methods to determine**
Contextual	Understanding the form of pro-environmental behaviours as they are performed in organisations The meaning of being an `environmental citizen`	The extent to which different forms of pro-environmental behaviours are performed
Explanatory	The process that encourage performing of pro-environmental behaviours Why behaviours are not performed	Characteristics of social media that correlate with different types of pro-environmental behaviours
Evaluative	Appraisal of any intervention experienced	Extent to which intervention achieve required outcomes
Generative	Suggestions/strategies for the use of social media for supporting people to perform pro-environmental behaviours	Prediction of future level of up taking of pro-environmental behaviours mediated by social media

Table 5. Contribution of qualitative and quantitative methods to different research functions. Personal elaboration from Ritchie & Lewis (2003, p.39)

In addition, the combined use of quantitative and qualitative methods can moderate the weaknesses of a purely qualitative approach, through the testing of results (Bryman 2004). Qualitative research is often accused by quantitative researchers of being subordinate to the personal interpretations made by the researcher, and that this can create bias. It is also accused of being difficult in generalising findings and to be replicated (Creswell & Vicki 2007).

The research is interested in understanding people's views toward pro-environmental behaviours in an institutional context and in understanding how social media are being used in this perspective.

There are many research methodologies open for a qualitative research approach: case study, action research, ethnography, grounded theory and heuristic inquiry (Bryman 2004; Gray 2004; Robson 2002).

4.2.1 Case study: De Montfort University

> *Case study is a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence.* (Robson 2002, p.52)

Case study is defined as a research strategy and not only as a method of data collection (Robson 2002; Gray 2004; Stake 2005; Yin 2003). The epistemological question underlying the investigation considers what can be learned about and from the single case (Stake 2005). Case studies can be of different typologies: *intrinsic* case study are primarily interested in the case itself, without any desire of representing more general situations; on the contrary, in *instrumental* case study the case is analysed with the primary interest of getting insights into a wider issue; the case itself is of secondary importance, but it facilitates the comprehending about something else (ibid.). In the second instance there are many cases that would hypothetically be representative of the phenomenon of interest. However, only a few of them are accessible. In deciding which one, Stake suggests that the researcher should choose the case from which he feels he can learn the most. And this may mean the most accessible one (Stake 2005).

Case studies moreover are not only interested in describing a specific situation, but also in defining causal relationships between the phenomenon observed and the context in which it is occurring (Gray 2004). Those characteristics of the context, which can only be meaningfully studied in real-life situations, are highly pertinent to define the studied phenomenon (Yin 2003; Stake 2005). When deciding which research strategy is more suitable for our own research project Yin states that case study is

preferred when one is trying to give an answer to 'how' and 'why' questions (Yin 2003).

The case study of De Montfort University is central for an investigation around the four inter-related issues of public engagement, behaviour-change, environmental citizenship and social media, because of its natural accessibility and its highly interactive community of social media users. De Montfort University is a large city-based University with approximately 27000 students and 3240 staff (DMU 2016). Its interest in environmental and sustainability initiatives started with DMU's involvement in Leicester's successful plan to become the first environment city in 1991, followed by the establishment of the Institute of Energy and Sustainable Development (where the current study was undertaken) in 1994. A commitment to sustainable development is embedded in the University Strategic Framework:

> *We acknowledge our responsibility to cultivate sustainable working and learning environments that embody and promote equality of opportunity amongst communities, both within and outside the university.* (DMU 2015, p.5)

A comprehensive range of activities have been undertaken under the themes of research, teaching, estates management, community engagement and health and well-being to achieve better environmental performances. As part of this, in 2011 the sustainability team at DMU decided to trial using social media as a tool for engaging staff and students. Having started with an *ad hoc* approach to using social media, in the autumn of 2012 the team decided to implement a specific campaign to engage staff and students in environmental initiatives through social media, which is where the present research comes in play.

The sustainability and transport officer at DMU were at the time managing the Twitter and Facebook accounts for SustainableDMU, but were looking for the possibility of improving the communication and engagement on the page. This is the reason the two

activities were integrated: this research and SustainableDMU communication. Together with the sustainability team it was decided that we would run the present research through the @SustainableDMU account, so that the intervention was coming from an institutional account and not a private one, and that the team would be involved only marginally in managing the accounts for the 8 weeks of intervention, where most of the activity would have been managed by this research independently. They were however invited to participate in the campaign in their personal capabilities whenever they felt involved in the discussion, as if they were any other participants in the campaign.

The aim of the campaign was to generate engagement around sustainability between DMU staff and students and to test what impact, if any, social media based communication would have on behaviour. Following this research agreement with the Sustainability Office at DMU, the official sustainability Twitter account[3] and Facebook page[4] were used for the research. A search of 'DMU', '#DMU' and 'DeMontfort' was performed on Twitter to uncover a list of active users to add to the @SustainableDMU network, with the aim of following and observing the conversation taking place on Twitter between DMU users and analysing the 'conversations.' A participatory campaign (that is, a campaign aimed at engaging participants and not only at informing them) was implemented over a period of eight weeks; further details are provided in the next sections.

The research of active users on Twitter demonstrated that DMU community of social media users was extremely diverse and lively (DMU 2014). The Vice-Chancellor (tweeting under the username @DMU_VC, today @DMUVC[5]) was instrumental in this growth, actively using Twitter as a means to communicate with staff but especially

[3] https://twitter.com/SustainableDMU

[4] https://www.facebook.com/SustainableDMU

[5] https://twitter.com/DMUVC

students; it is now common for them to report problems, but also to get answers and help, in addition to the institutional communication (find example here in note [6]). Twitter is also used by the Vice-Chancellor to update staff and student of future events and transformation of DMU (find examples here in note [7]). As mentioned, DMU social media community is very diverse and it is composed are not only of young people from the student population, but it also can count a considerable number of staff, which makes it an interesting research subject.

Even though the case study approach seems the most appropriate for the present research one point is in conflict with the case strategy: according to Yin the researcher cannot control or influence the phenomenon he is studying (Yin 2003). As he says "*the case study is preferred in examining contemporary events, but when the relevant behaviours cannot be manipulated"* (Yin 2003, p.7). In this case instead, the active participation of the researcher in the process is sought to see if and to what extent the intervention is able to change the implementation of pro-environmental behaviours. Therefore action research methodology has been used in conjunction with case study.

4.2.2 Action research

Action research can be defined as an approach that "focuses on simultaneous action and research in a participative manner" (Coghlan & Brannick, 2001, 374 in Gray, 2004). In this approach the researcher is an integrative part of the research study and a strong collaboration between researcher and researched is sought in opposition to conventional research that pursue to minimise the involvement in the interest of

[6] https://twitter.com/alan_johnson95/status/861996419468718083 accessed 20th May 2017
https://twitter.com/MrMostafaMiah/status/859741419606601729 accessed 20th May 2017
https://twitter.com/RachelPeckover/status/859530763905249280 accessed 20th May 2017

[7] https://twitter.com/DMUVC/status/859739231836676097 accessed 20th May 2017
https://twitter.com/DMUVC/status/863733376817213442 accessed 20th May 2017
https://twitter.com/DMUVC/status/863733921594449920 accessed 20th May 2017

objectivity (Robson 2002). Its operation demand changes and action, both of the system under consideration, and of the people involved in that system (McNiff 1998). The fact that action research emphasises specific situations and practices in a particular context with the aim of producing change in that context, places this approach within the case study strategy (Robson 2002).

There are three fundamental features of action research (Gray 2004):

1. Research is considered a driver of change;
2. Subjects of research are themselves researchers or they are involved in democratic partnership with the investigator;
3. Data are generated from direct experiences of participants.

Following these principles this research (1) aims to drive a change towards a pro-environmental models in the institution; (2) the researcher is part of DMU community (including the social media one); and (3) the data are generated by the involvement of participants in the participatory campaign and as such are a consequence of their experiences in interacting on social media and in the real setting.

Stringer suggests that the main aim of action research is to uncover the different perceptions and interpretations held in the research context by different groups and individuals (Stringer 1999). Therefore, action research does not aim to identify causal relationships, but actions that can lead to positive change (Gray 2004). To do so all the essential voices needs to be heard (Stringer 1999). Interestingly, action research and public participation have many common characteristics (which are explored in Table 6). These are the main reasons an action research approach was selected for the present study.

Action research	Public engagement process
The researcher is seen as more of a facilitator than an `expert`. The researcher in fact is not there to offer solutions but to enable people to develop their own analysis of the issues facing them and the potential solutions (Gray 2004).	One of its main characteristics it that participatory approach do not to impose solutions from the `expert` point of view, but try to construct a solution that take into account the knowledge of all the stakeholders.
Promote feelings of equality for all involved (Gray 2004).	Fairness of the participatory process (Webler and Tuler 2000).
Listen attentively to people and regularly advise others as to what happening (Stringer 1999).	Ensuring that everyone has the possibility and the ability to speak in the meetings and ensuring that everyone (also the broader community) is up-to-date about the process (Petts 2006).
Enable significant levels of involvement.	Participants must have the opportunity to freely initiate discourses and to equally participate in the discussion. Participants must have the possibility to contribute in the decision-making; this means that everyone should have the same opportunity of influencing the ultimate outcome of the process (Webler and Tuler 2000).
Maximise the involvement of all relevant individuals and ensure that all relevant groups benefit from activities (Gray 2004).	Fairness refers to the possibility of every affected group to adopt an authentic position in the decision-making process (Webler and Tuler 2000).
Action research is also seen as a tool for bringing about democracy (Lewin 1946 in (Robson 2002)).	Public participation is an enhancement of democracy (Arnstein 1969).
One of the outcomes of action research is that learning is generated among the participants (Gray 2004).	Social learning is one of the main outcomes of a public participation process (Webler, Kastenholz et al. 1995).

Table 6. Action research and public participation. Common characteristics

The present research is not aimed at studying DMU as an organisation, therefore challenging the functioning, relations and practices within it, but it aims to study the practices of pro-environmental behaviour as they are performed within the context of the university and in bringing about change regarding the way people talk about environment and sustainability on social media and take actions after these conversations.

4.3 Methods

With the aim of collecting both quantitative and qualitative data to test the effectiveness of the participatory process different methods of data collection were chosen:

1. An online questionnaire open to all DMU staff and students to understand baseline condition (quantitative data)
2. Participants observation on social media (qualitative data)
3. Quantitative data collection of interaction on social networking sites from different on line tools
4. Semi-structured interviews with selected participants (qualitative data)

The following table (Table 7) illustrates the planned data collection methods in relation with the research objectives. Each method will be analysed in more detail in the following section.

Objective	**Methodology**	**Chapter**
OB 1. To review current behaviour change theories in organisations	Academic Literature Review In-depth interviews with campaign paticipants (both staff and students)	Chapter 3. Literature Review
OB 2. To map the rise and development of digital technologies and social media with reference to current trends	Academic and Non-Academic Literature Review	Chapter 2. Background Chapter 3. Literature Review
OB 3. To create and test a methodology for the analysis of social media participatory campaign and its effectiveness in facilitating public engagement	Quantitative analysis of on-line traffic and qualitative content/discourse analysis of conversations using fairness and competence criteria	Chapter 4. methodology Chapter 5. Quantitative analysis of social media Chapter 6. Qualitative

		analysis of social media
OB 4. To critically assess the potential of social media as a behaviour change tool leading to behaviour-change and environmental citizenship	Semi-structured interviews analysed using social learning criteria	Chapter 7. Qualitative analysis of interviews
OB 5. To understand the wider opportunities and barriers for future applications of social media and public engagement in organisations	Discussion and reflection on results	Chapter 8. Discussion of results

Table 7. Summary of research methodology

4.4 Study Design and Measurement

The study was implemented in three different phases: (1) Prior to intervention, to understand and evaluate the initial conditions; (2) During intervention, through the implementation of the social media campaign following the action research participatory approach; (3) After intervention, to evaluate the impact of the campaign.

4.5 Prior to intervention – understanding initial conditions

4.5.1 Conducting pre-intervention analysis on social media use

The pre-study is composed of an on-line survey, which collected quantitative data. The survey was emailed to all staff and students in De Montfort University that is around 20.000 students and 3.000 staff in April 2012. The survey was designed on Survey Monkey[8], an online survey software and questionnaire tool (and it is attached to the present thesis in Appendix A). To email the survey different approaches were used; for staff it was emailed through the Environmental Champion network, for Graduate students through the Graduate Office emailing list, and for Undergraduate students through the Internal Communication emailing list.

[8] http://www.surveymonkey.com/

Because the participatory process had been happening on social media, the survey asked questions about the awareness and use of Social Network Sites, including the use via mobile phones. The results (some of them are presented in Table 8) gave the researcher insights about which would be the preferred channel for engagement.

Social media platform	% of people who knows the tools	% of people who has an account	Frequency of use
Facebook	96.3%	82.4%	35.3% every day
YouTube	94.9%	33.1%	74.3% never
Twitter	93.4%	47.1%	56.6% never 17.6% every day
MySpace	83.8%	8.8%	97.8% never
LinkedIn	83.1%	53.7%	53.7% never 15.4% every week
Google +	79.4%	33.8%	77.9% never

Table 8. Percentage of awareness and use of social media tools at De Montfort University

Clearly Facebook is the most popular social network tool at De Montfort University and was therefore chosen to be the principal way of engagement, followed by Twitter and LinkedIn. On the other hand the Facebook page has not as many followers as the Twitter account; therefore a parallel and similar use of these two tools was defined.

Questionnaires are one of the most used data gathering tool, often in combination with other methods in case studies research (Gray 2004). Questionnaires are used when the audience is relatively large and may be used as a first step in data collection, to be followed by in-depth interviews or observation with a smaller sample (ibid.). Using questionnaires has many advantages; they are low cost in terms of time and money, it is possible for the respondent to complete the survey at the chosen time and place, respondents' anonymity is easily assured, data analysis is relatively simple and can be performed quickly, interviewer bias is more difficult to occur (Gillham, 2000 in

Gray, 2004). However, questionnaires also have their disadvantages because response rate can be very low, especially with too long questionnaire, and because there is no opportunity to ask questions to clarify ambiguous, inaccurate or misleading answers (Gray 2004).

4.5.2 Tracking frequency and content of pre-test social media interaction

As already mentioned, the Twitter account and Facebook page used for the present research were created and launched prior to the intervention to create a significant number of followers to gain a considerable attention from DMU staff and students. As it will be visible from the analysis of the data and of the interviews, the issue of obtaining considerable attention on social media is central for the effectiveness of any communication effort, in particular when interaction is sought. The administration of the account was in the hands of 1 person mainly: the present researcher. The two officers from the Sustainability and Transport Office closely collaborated throughout the whole process, but in a personal capability.

One of the first objectives was to understand how many people were active on social media at DMU. For this reason a search of 'DMU', '#DMU' and 'DeMontfort' was performed on Twitter. The result of the search outlines a list of active users that in the majority of the case have been added to the @SustainableDMU network, with the aim of following and observing the conversation taking place on Twitter between DMU users, of analysing the main topics of conversation, and of inviting them to follow @sustainableDMU account. The search also gave a list of 25 top Twitter users at DMU (see Table 9; classification is made by number of followers) that were analysed in order to get a better picture of the network and of influential accounts whose interaction during the campaign was important.

	Twitter name	Followers	Role in DMU
1	@DMUVC	3323	Vice Chancellor
2	@HallyMk1	1890	Head of ELT
3	@suethomas	1560	Professor of New Media
4	@Mitchley	1221	Work for @LibraryDMU's Content Delivery Team.
5	@papaver	988	Faculty Manager Health and Life Science
6	@AlisonMcNab	910	Academic librarian
7	@grahambasten	848	DMU Associate Head: School of Allied Health Sciences
8	@Socialhousing	806	Housing Lecturer at the Centre for Comparative Housing Research, De Montfort University, Leicester
9	@jwebbery	779	Head of Learning and Research Services at a UK university library
10	@willbuckingham	736	Senior lecturer in creative writing at De Montfort University He has a website and a blog http://www.willbuckingham.com
11	@DrMilesWeave	736	Senior Lecturer in Strategic Management He has a blog http://drmilesweaver.our.dmu.ac.uk/
12	@LiamDavisDMU	736	President of DMU students Union 2011/12
13	@jjwood01	685	PL and Square Mile Research Director, De Montfort University, Leicester
14	@tgboeck	615	senior research fellow at De Montfort University, social capital, participation, social action, amplification, community cohesion, social justice, social media
15	@c3iq	523	UNISON branch secretary at De Montfort University.
16	@davidnaylor	503	Project & Finance Coordinator in DMU Faculty of Technology He has a blog http://fumbfilms.wordpress.com/
17	@Rangtang	499	Academic Librarian/Team Manager
18	@DMU_JMG	496	@DMUSquareMile Project Director
19	@seancuttlefish	490	Artist/Researcher and Technologist

			He has a website and a blog http://www.seanclark.me.uk/
20	@amclay09	394	Lecturer
21	@Fulup	338	Librarian/Web designer at De Montfort University He has a blog http://fulup.our.dmu.ac.uk/
22	@ahugill	321	Director of the Institute Of Creative Technologies, De Montfort University, Leicester, UK. He has a web site http://andrewhugill.com/
23	@heidimacp	290	Pro Vice-Chancellor Research & Innovation at DMU
24	@DMU_Sarah	264	Works for Strategic Partnerships at DMU
25	@ShaunTurnerDMU	185	Student Comedian and member of DMU Footlights

Table 9. The 25 most active Twitter users of DMU community (September 2012)

This process is more complicated on Facebook; it is possible to perform searches, but then it is not possible to invite people to 'like' a page. It is in fact only possible to invite friends and ask people to invite their friends. Therefore the three administrators of the page invited their 'Facebook friends' and invited them to do the same.

In order to get greater attention in the DMU social media network the links to the Twitter and Facebook account were included in various DMU Internal Communication emails and stickers with the links were circulated during Open Days and different events at DMU.

All baseline evaluations are dated on September 2012.

4.6 During intervention

The present section will shortly present the different steps necessary to the implementation of the participatory process:

1. Interventions using participatory approaches and action research methodologies;
2. Tracking of social media interactions and responses to interactions;

3. Implementation of the social media campaign;
4. An action research intervention and participant observation on social media

4.6.1 Interventions using participatory approaches and action research methodologies

The social media campaign intended to develop as a participatory process; Twitter and Facebook were used with the double intention of providing information to DMU users, but also of nurturing the creation of a public participation process, in the sense that people would have a public, although virtual, place to talk about sustainability, to exchange ideas and advice on how to be pro-environmental, and to point out to the sustainability office any concerns or inefficiencies around the university. The aim was therefore to generate a genuine engagement process about sustainability between the users of DMU with the ambition that this will lead not only to a change in their attitudes, but also in the up-taking of practical pro-environmental behaviours.

4.6.2 Tracking of social media interactions and responses to interactions

During the intervention stage, social media metrics and content were tracked on a weekly basis (Monday morning of each week). The tools that were analysed were Facebook and Twitter. To do so, different social media analytics, both free and not, were tested (see Table 11 in Chapter 5). To find them a search on Google.com was performed with the following keywords: ‘best social media monitoring tools’, 'free social media monitoring software’, ‘social media monitoring tool’, ‘social media mining software’. The different tools have been tested to check their potentialities and determine which type of information they were able to collect. After this step some tools have been chosen because they could collect data vital for the understanding of the present study. Moreover, the free tools have been preferred with the aim of creating a methodology that could be tested by other universities and institutions without too high investment of financial resources.

Before introducing the different tools used to analyse the social network a clarification is necessary. Analysing social networks is challenging, interaction is very quick, numbers change day-by-day, and hour-by-hour and there are many parameters to be taken into account. For what concerns Facebook, metrics were provided directly by the platform, therefore analysis was slightly easier for this platform. With Twitter there were greater difficulties; Twitter.com launched its embedded analytic tool only in August 2014[9][10]. Before that date Twitter did not provide any analytics about the activity of each account. For this reason many other tools for social media metrics were tested and used during, before and after the campaign. Some tools, moreover, give the possibility of bringing together measures of Facebook and Twitter to calculate influence and engagement, for example Klout and Sprout Social. Another difficulty of Twitter is the fact that the website do stores tweets (it is in fact possible to see all the tweet of all the users; however the time of loading of tweets can be prohibitive), but when setting up an account with an analytics tool it is not possible to retrieve retro-dated data (it is usually possible to do it up to 2 or 3 weeks); therefore it was necessary to set up the specific tracking software before the beginning of the intervention. In this way the metric tool will collect and store the data and made comparison over time possible.

The different tools used and the metrics recorded are explained in detail in Chapter 5.

4.6.3 Implementation of the social media campaign

Each day one or more posts were published and discussion was fostered both on Twitter and Facebook. The specific design of the campaign is explained in Chapter 5. Most of the updates were done on Twitter with the use of Tweetdeck[11]. Tweetdeck is

[9] https://blog.hubspot.com/marketing/twitter-launches-tweet-analytics-to-all accessed 26th March 2017

[10] https://analytics.twitter.com/ accessed 26th March 2017

[11] http://www.tweetdeck.com/ accessed 20th March 2013

an online management tool for Twitter and Facebook and gives the possibility of monitoring the stream of tweets, the interaction (new people that followed the account, mentions and retweets) and the private messages received. But it also gives the possibility of scheduling tweets, a very useful function considering the importance of being timely with tweets. With Tweetdeck it is also possible to monitor hashtag searches and lists. For example, during the research #DMU was meticulously monitored to be aware of every time someone was talking about DMU. In addiction a DMU staff and students list was created in order to keep up to date with people at DMU without following them[12]. This was done with the intention not only to understand what people were saying about DMU, but also of interacting with people that were mentioning issues and observations related to sustainability. So for example, if someone was saying that in DMU it was very hot or very cold, it was possible to ask in which room he or she was and inform the energy manager to resolve the issue. Other search that were tracked on Tweetdeck among others are: #sustainability, #climate, #greenimpact, #energy and #ecomonday. This was done with the intention of understanding what the general public was saying regarding those issues on Twitter, of interacting with those that were mentioning environment-related topics, and of retweeting to @SustainableDMU's followers relevant information.

The activity and interaction of Twitter and Facebook have been different, due to the intrinsic characteristics of the two tools. On Twitter the frequency of tweets varied from once an hour to 4 or 5 times a hour, because timely presence is one of the most important characteristics for the success of communication on Twitter. The tweet-stream updates itself continuously; therefore depending on the number of people one is following the stream can download tweets very quickly. This means that one user will see a tweet only if he is looking at his Twitter feed at that exact moment or few minutes later. For that reason tweeting every 15-20 minutes was necessary from time to time. On Facebook instead posts remain on the page and it is possible to manage

[12] How to use Twitter lists https://support.twitter.com/articles/76460 accessed 26th March 2017

the importance of each post and to reorder them, therefore the frequency of Facebook posts varied from 1 to 5 times a day.

As presented in section 4.6.1, the aim of the campaign was not only to provide information to DMU staff and students, but mainly to foster engagement and participation around the topics of energy and sustainability. Therefore most of the tweets and posts on Facebook were done in the form of questions, so that people were motivated to interact (the list of tweets and Facebook posts published by SustainableDMU during the intervention period is presented in Appendix B).

4.6.4 An action research intervention and participant observation on social media

The observational method is associated with ethnographic methodology (Gray 2004; Silverman 2006). "*Ethnography is the study of people in naturally occurring settings, or 'fields', by methods of data collection which capture their social meanings and ordinary activities, involving the researcher participating directly in the setting, if not also the activities, in order to collect data in a systematic manner*" (Brewer 2000 quoted in Silverman 2006 p. 67). Although ethnography and participants observation are often used interchangeably, an ethnographic approach has not been used for the study, mainly because the purpose of it was not only to observe and understand the reality the researcher was immersed in (De Montfort University and its community of social media users), but mainly to be an agent of change, following the action research methodology, that is to encourage and foster conversations and discussions to test the participatory model as an agent of change.

Participant observation, however, has been used as a data collection method by different research approach, such as action research (Stringer 1996; Stringer 1999) and case studies (Yin 2003). Moreover, it has been claimed that in one sense all social investigation is a form of participant observation, because it is not possible to study the social domain without being part of it (Hammersley & Atkinson, 1983 in Atkinson &

Hammersley, 1994). Therefore, participant observation on social media have been conducted before and during the social media campaign as one of the methods of data collection, together with 'fields' note.

In the present case, it is key to define the 'field' of observation: participant observation, especially in the context of ethnography, is connected with the idea of a researcher visiting places or organisations and immersing himself in the community. The Internet seems to go against this idea, because it appears as a 'placeless space'. However, an ethnography of the Internet has been explored by different researchers (Hine 2000; Bryman 2004; Kendall 1999; Brauchler 2005; Morton 2001). Hine calls her approach 'virtual ethnography', matured as a response to the need to study communities in which the use of electronic communications are routine (Hine 2000). She carried out a study through the medium of a technology, which appears to produce text, but where the technology is also the channel of communication for the human subject of research. Therefore it is a study through and within technology, where the virtual community is the 'field' of study and the group of people involved behind the screen is the object of study (Brauchler 2005; Hine 2000).

The same can be said of the present study: studying and testing if interaction happening online can have repercussions on the 'real' environment of DMU. It is not only an observation through technology, in this particular case social media, but also an observation within the technology of the community of social media users at DMU. What the researcher is interested to understand is how sustainability and environmental issues enter into this virtual community and how the virtual and the real world are connected. So the Internet is not only the holder of content and information, but also a place of action, interaction and social relationship (Thompson 1995).

Therefore, observation and participation of the online communication between social media users at DMU have been carried out during the period of 8 weeks of the social media campaign, with special regards to conversations that had connections with

sustainability and environmental issues. Conversations have been noted down, both manually and electronically through the download of conversation from Twitter and Facebook.

4.7 After intervention

4.7.1 Interviews

Interviews are a powerful instrument for producing rich data on people's attitudes, views and the meaning that underpins their behaviours (Gray 2004). There are several types of interviews: structured, semi-structured, unstructured (Robson 2002; Gray 2004; Bryman 2004). To choose the more appropriate it is necessary to consider the research approach and the objectives of the study. Within a qualitative philosophy, semi-structured or unstructured interviews are considered the better methods. First, it is possible to investigate the significant meaning of a question, whereas this is not easily achievable with surveys (Gray 2004). Second, qualitative interviews are particularly useful in accessing individuals' values and attitudes, something that is not easy to observe or to determine through a questionnaire (Silverman 2006). Finally, the flexible schedule allows to follow the direction of the interviewee's answers, therefore making possible to discover concepts that were not considered at the beginning by the researcher, but that reveal themselves as fundamental for the study.

However, interviews also have their disadvantages. First, interviews do not give the researcher access to the 'facts', but rather to people's representations of those experiences. This can inevitably bring to bias and flaws. Moreover, not everyone is comfortable with the interview process, so they might not feel completely free to communicate. Selection is also controversial, because some people may refuse to be interviewed, leading the sampling of participants to be a convenient or opportunistic one (Bryman 2004). Nevertheless, *"qualitative interviewing, when done well, is able to*

achieve a level of depth and complexity that is not available to other, particularly, survey-based, approaches" (Byrne 2004 quoted in Silverman 2006 p. 114).

Interviews have been conducted at the end of the intervention, that is at the conclusion of the social media campaign. 32 interviews, which lasted an hour on average, have been recorded.

It was difficult to accomplish a random sampling of the participants for the interviews. The interviews were conducted with the primary aim of evaluating the social media campaign, to be precise to evaluate if a change in environmental citizenship and pro-environmental behaviours had been achieved as a consequence of the campaign itself. Therefore the principal tools for recruiting participants were the social media network at DMU. A tweet was posted on the @SustainableDMU deck on the 23rd of November 2012, the last day of the campaign (see Figure 6).

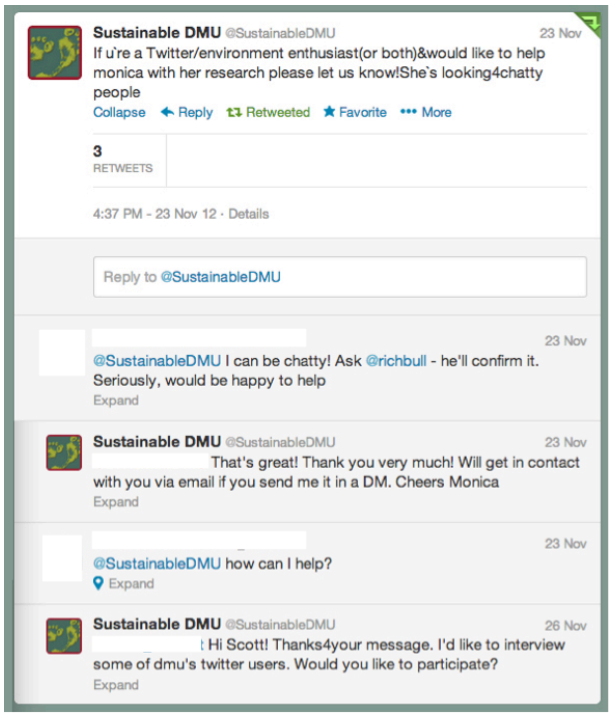


Figure 6. Tweet ending the campaign and recruiting participants for interviews

The intention was to recruit participants for the interviews. Unfortunately, the tweet was not very successful, securing only one interviewee. Therefore another strategy

needed to be explored in order to recruit more participants. Hence, people who had interacted with @SustainableDMU, both on Twitter and on Facebook were contacted to see if they were willing to take part in a conversation around social media and sustainability. 59 people were asked to participate in the interviews (30 on Twitter and 29 on Facebook). Among them 27 (17 on Twitter and 10 on Facebook) agreed to be interviewed, but then it was not possible to organise a meeting with 3 of them. Some of them (10) had some connection with the researcher; they were peers but they were actively participating in the campaign therefore it was chosen to interview them.

	Twitter	**Facebook**	**Both**	**Total**
Active participants	11	3	0	14
Peers	5	2	3	10
External participants	2	3	3	8
Total	18	8	6	**32**

Table 10. Subdivision of interview participants for social media tool used and relation with the interviewer

With the intention of having a 'control group' some external participants have been recruited too in two ways: asking the interviewees if some of their friends or colleagues, who were active on social media, would have been willing to participate in the interview and attending a lunchtime meeting in the TDC room (Trans-Disciplinary Common Room) which was focusing on the use of social media and asking people to volunteer for the interview in that occasion. It is possible to see the subdivision of interviewees according to the relation with the interviewer and the main social media tool used in Table 10.

Driven by the objectives of the thesis, the aim of the interviews was to discover people's perceptions of the social media campaign and their views on its effectiveness, to understand their use of social media tools and what impact they had on their daily

lives, how they view sustainability at DMU and how important environmental issues were in their private and public lives. Finally, but most importantly, it was aiming to understand what impact, if any, the campaign had on their behaviours.

A structure of the interview was outlined (see Appendix C) with some generic questions and more detailed prompts designed. The questions were designed from topics emerging from the literature review mapped together with the objectives of the study. However, understanding the need for allowing flexibility, the structure was not literally followed and the direction of interviews was lead by the interviewees' responses (Gray 2004; Bryman 2004). Subject to permission from the interviewees, all interviews were recorded using an iPhone with the SuperNote App and consequently downloaded to iTunes (a media player software for Mac OS-X platforms) to be transcribed. Interview analysis was driven by the research objectives and approached interpretively.

4.7.2 Analysis of data and reporting results

The results have been both quantitative (social media data about the campaign) and qualitative (social media content analysis, in-depth interviews, tracking and description of interaction between researcher and researched on social media). In the present study, the research aim and objectives shaped the analysis of the data collected, starting the coding of the interviews transcription with the research objectives, while new codes and theme have been derived from the analysis of the data. Coding refers to the identification of common themes, similarities, and differences that are revealed through the analysis of participants' interviews and need to be interpreted by the researcher (Bryman 2004; Robson 2002). The identification of themes that are considered to be important enables key information to be extracted from the data in an organised and meaningful manner. After a first step of more 'open coding' (which have although been driven by the thesis objectives), relationships between categories have been searched, to identify emerging themes and ideas (axial codings). Finally, the

emerging themes have been compared to the research questions to shape the generation of theory (selective coding) (Robson 2002; Gray 2004).

4.8 Ethics

4.8.1 The ethics of researching social media

The nature and expectations of privacy on social media are increasingly being debated and explored (see, for example, Gross & Acquisti 2005; Lenhart & Madden 2007; Solove 2007; Nussbaum 2007; Albrechtslund 2008; in Zimmer 2010). Some social media services allow users to choose their privacy settings, e.g. Facebook and LinkedIn allow users to protect the display of information and Twitter allow users to keep their profiles private (Boyd 2010; Boyd & Marwick 2011), which means that the user can approve who sees their information and the content they publish. As such, in certain case content can be publicly available, e.g. it is possible to run searches on Twitter for publicly available content without having a connection with the people that are sharing the content and without having a profile on Twitter; the same happens for YouTube.

However, the fact that data are already public is not a sufficient justification for researchers and additional measure to ensure confidentiality and privacy of the data needs to be applied to social media research (Zimmer 2010).

These concerns were revealed through the controversy surrounding the 'Tastes, Ties, and Time' project (Lewis et al. 2008). The researchers in this project downloaded a large dataset of information from Facebook related to a single university. Although they anonymised the identities of the participants, some of them were identified given the uniqueness of the information presented and by the fact that they were members of a minority group. In addition, the case-study university was identified through the list of college majors in the study population. This project stimulated a vast controversy regarding confidentiality within Facebook and social media research.

4.8.2 The present study

Efforts were made to protect the rights of participants, including their rights to anonymity, confidentiality, informed consent and to withdraw from the study at any moment. Permission for the study was obtained from the Ethical Committee at DMU.

Informed consent forms were signed in duplicate copies; a copy was kept by the researcher while the second was given to the participant. Interview participants were anonymised and the records of their conversations will be protected from disclosure of the information they contain.

Regarding the present study, it needs to be noted that the data recorded for the study is different from the studies about social media cited in the previous chapter where researchers downloaded large amount of 'Big Data'; the data collected in the present study were relative to interaction with SustainableDMU either on Facebook or on Twitter. At the start of the campaign a tweet and a post were published on the two platforms warning of the start of the research project and a comments was left on the blog for the entire period of the collection period. In addition, users have been anonymised through a progressive numbering (T1, T2 … Tn on Twitter and F1, F2 … Fn on Facebook) to preserve the identification. The researcher is however aware on the possibility of identifying users (especially on Twitter) from the citations of tweets and comments posted.

5 Results. Measuring the impact of discourse-based social media

This chapter explores approaches to measuring the effectiveness of discourse-based social media. Developing effective ways to define, measure and evaluate the effectiveness (or success) of social media activities is an issue faced today by many and different organisations; e.g. the cultural sector (Finnis et al. 2011), or the government sector (Government Digital Service 2012; Howto.gov 2013) and finding the ways to analyse activity on social media during the participatory campaign was key to the present research as well.

This chapter then addresses one of the core objectives of the thesis (Objective 3): the design of a methodology for the analysis of social media. It focuses on what tools are available, how they can be used and what kind of results can be generated. The following chapter (Chapter 6) presents an analysis of the conversations that occurred during the campaign.

The structure is as follows. In Section 5.1 there is an initial discussion on what defines successful social media use and a review of the available tools for the analysis of engagement on social media. These are discussed before presenting the chosen tools used for the study. In Section 5.2 it is explained how the social media campaign was designed and implemented. This is followed by Section 5.3, where the effectiveness of the campaign is evaluated and reviewed using the chosen tools before the limits of such an approach are outlined in Section 5.4.

5.1 How do we measure social media?

Social media monitoring is a relatively young 'science', initially adopted by public relations and advertising agencies, who used it as a means to identify negative comments posted on the web about their clients (Barker et al. 2012), it is defined as the activity of observing and tracking content on the social web (ibid.). This allows companies to then react to what is said about them and to interact with consumers via social media platforms (Financial Times 2014).

5.1.1 Current approaches to measuring social media impact

As said, social media monitoring is the activity of observing and tracking content on the social web. Each activity on social media has an outcome, or *effect,* which can be measured by observing and then quantifying specific behaviours on social media channels (Barker et al. 2012). Effects can be one of the following: retweets, mentions, favourites, follows, likes, shares, comments, sentiment, etc.

However, social media are not only used by companies and public relations agencies, they have increasingly been used by any form of organisations (cultural, educational, environmental, etc.), by local councils and central governments, who have gradually understood that this is the easiest way to reach their audience. For example, the UK Government opened up to social media with the aim of communicating *"with citizens in the place they already are; to consult and engage; and to be more transparent and accountable"* (CabinetOffice 2012, p.1). Although this is a relatively recent phenomenon, there are many Social Media Policies produced by different authorities to guide their staff in the use of social media[13]. On the other hand, few are the efforts to 'evaluate' the use of social media channels as a communication or engagement tool. Few examples can be found in the UK cultural sector, for example the publication of a report of an action research project to evaluate online success of British museums (Finnis et al. 2011) and in the US government that provides Social Media Metric for Federal Agencies (Howto.gov 2013). In these reports the emphasis is not on evaluating social media efforts for marketing purposes, but to provide organisations effective tools to understand if their efforts in engaging citizens have been successful and what success means for them. It is specifically the emphasis on engagement and collaboration with citizens that makes these approaches different from the marketing strategies, which are more focused in connecting companies with their clients with the intention of converting conversations into profit. At the same time, the metrics to be collected from social media are more or less the same; being

[13] An online database with more than 170 policies from across different sectors is available at http://socialmediagovernance.com/policies.php accessed March 2016

the already mentioned *effects*, which are the actions that are quantifiable on the web.

Monitoring and reporting social media use can be a confusing and time-consuming process and it also tells little about the 'users' behaviour, engagement and satisfaction. There are a plethora of tools and metrics to measure online activity (see Table 11 for a non-exhaustive overview of social media monitoring tool).

Name of tool	**Functionality**	**Free**
Crowdbooster	Social media analytics with suggestions and tools to improve online presence. In particular it offers instant and visual feedback about performance (of tweets or Facebook posts), tracks the growth of the audience, gives alert and recommendations with whom to engage or who or what to pay attention.	Free until March 2013
Foller.me	Analyses a user's tweets and followers and organises the topics the user has been talking about in a tag cloud. It also provides information about time zone of followers and followers ratio.	Yes
Follower Wonk	Used to track follower gains and losses, do global searches in Twitter bios, compare Twitter accounts, and analyse any account's followers.	Yes for basic features
Hootsuite	A social media management system. Together with the possibility of managing different accounts in the same dashboard, Hootsuite also offers social analytics, such as the integration of Facebook insights, Google and Google+ analytics, Twitter profile stats, and click stats.	No
Klout	Uses social media analytics to rank its users according to online social influence via the "Klout Score", which is a numerical value between 1 and 100. In determining the user score, Klout measures the size of a user's social media network and correlates the content created to measure how other users interact with that content.	Yes
PeekAnalytics (now StatSocial)	Creates reports about users' audience, demographics, geographic, interests by tracking mentions of keywords, trending topics, URLs, @usernames, and hashtags.	Yes for basic features
Retweet Rank	Calculates the RetweetRank of users on Twitter. The tool tracks recent tweets, retweets, number of followers, friends, and lists of a user. Then it is compares these numbers with those of other users' and assigns a rank as measure of influence.	Yes for basic features
Spout Social	A social media management platform to monitor incoming messages and schedule posts for twitter, Facebook, Google+, and LinkedIn. It helps engagement with audience and provide social media analytics and monitoring of keywords and hashtags.	No, 30 days free trial

Tweet Archivist	TweetArchivist's aim is to capture tweets. Twitter is in fact designed to store tweets till a certain date (which is 3000 tweets back in time) therefore it is better to capture tweets before they disappear. TweetArchivist does not store all the tweets ever tweeted, but it is possible to start monitoring an hashtags, user, or a search term and the software will pull as many tweets as possible. It is possible to repeat search over time. The tool also gives some basic analytics, such as determining sentiment, find influencers, or view most popular tweets.	3 days free trial
Tweetdeck	Display Twitter timeline, mentions, direct messages, lists, trends, favourites, search results, hashtags, or all tweets by or to a single user. All columns can be filtered to include or exclude words or tweets from users. Tweets can be sent immediately or scheduled for later delivery.	Yes
Tweet Stats	A tool to graph statistics from Twitter. Statistics are composed by the tweets and analytics of each user.	Yes
Tweriod	Analyses the user's tweets and its followers' tweets to determine the best time for the user to tweet for best results.	No
Twilert	Monitors all mentions of chosen keywords (mentions, hashtags, but also simple words) on Twitter. It is possible to set the frequency of Twilert's alerts.	Yes
Twitter Counter	Provides statistics of Twitter usage, such as number of Followers, mentions, tweets, etc.	Yes for basic users, payment for higher quality feedback and analytics.
Twitalyzer	AnalysesTwitter, through definition of influence, signal to noise ratio (i.e. the tendency of people to pass information, as opposite to anecdote), generosity (i.e. is the number of time an user retweets others), velocity (i.e. the number of updates over a seven days period), and clout (i.e. the number of times a user is referenced by others).	30 days free trial
Viralheat (now part of the Cision group)	Software for social media management, which also allows users to monitor and analyse their social media. It tracks mentions and analyse factors as sentiment, influence, and language.	14 days free trial

Table 11. An overview of tools to analyse social media.

As Table 11 shows, there are many tools available for social media data mining, and many of them overlap in term of the measured metrics. Moreover, it needs to be said

that the more accurate and detailed the offered metrics the more expensive the tool was. However, the guiding principle of the project was to use tools that were free, so that the methodology could be replicated by other institutions. Moreover, some paid tools, e.g. Sprout Social or Hootsuite, give the possibility to manage one's accounts from the tool itself, making it possible to track the effectiveness of the proposed communication strategies at the same time and in the same place where communication happens. Therefore they make the task easier, but they are not essential in the implementation of a social media campaign.

5.1.2 Defining success for the present study

Popularity, or success, on social media is often measured in term of number of followers; the more followers one has the more one is popular. In term of social media marketing success is also often measured in term of ROI, e.g. Return on Investment, which is a measure of net profit gained per cost of investment. However, in the context of the present research success or effectiveness cannot be measured only in term of followers and or in monetary terms.

The aim of this thesis is to evaluate the use of social media for enhancing environmental citizenship and promoting behaviour change in engaged individuals. To do so the first step is to foster people to participate in discussions that happen online, in the same way in which a 'traditional' public engagement process would recruit participants for face-to-face workshop.

Success or effectiveness in term of the present environmental campaign is therefore measured by the quantitative analysis of engaged individuals around the concept of sustainability at DMU (which is measured through the growth in community size), and by the growth in the community engagement and the created conversations, which will be measured with different metrics from social media. The analysis of those measured activities will show if social media are an effective tool for fostering engagement and conversation.

Table 12 shows the tools used with rationale for their choice among the ones which have been presented in Table 11.

Name of tool	**Functionality**	**Purpose**	**Free**
Tweetdeck	Display Twitter timeline, mentions, direct messages, lists, trends, favourites, search results, hashtags, or all tweets by or to a single user. All columns can be filtered to include or exclude words or tweets from users. Tweets can be sent immediately or scheduled for later delivery.	Daily implementation of campaign, keeping track of hashtags and search, scheduling tweets, and tracking interaction during the day-to-day activity.	Yes
Klout	Uses social media analytics to rank its users according to online social influence via the "Klout Score", which is a numerical value between 1 and 100. In determining the user score, Klout measures the size of a user's social media network and correlates the content created to measure how other users interact with that content.	Keep record of influence and engagement.	Yes
Spout Social	Sprout Social is a social media management platform to monitor incoming messages and schedule posts for twitter, Facebook, Google+, and LinkedIn. It is integrated with Google Analytics, UserVoice, and Zendesk for analytics.	Keep record of influence and engagement.	No
Crowdbooster	Crowdbooster offers social media analytics with suggestions and tools to improve online presence. In particular it offers instant and visual feedback about performance (of tweets or Facebook posts), tracks the growth of the audience, gives alert and recommendations with whom to engage or who or what to pay attention.	Keep record of tweets, mentions, and retweets	Previously yes, now payment
Twitter Counter	Twitter Counter provides statistics of Twitter usage, such as number of Followers, mentions,	Track Twitter stats	Yes for basic users,

	tweets, etc.		payment for higher quality feedback and analytics.
Twilert	Twilert monitors all mentions of chosen keywords (mentions, hashtags, but also simple words) on Twitter. It is possible to set the frequency of Twilert's alerts.	Track hastags	Yes

Table 12. Chosen tools used for tracking Twitter metrics

5.2 Social media campaign design

The social media campaign was designed with the intention of nurturing a process of engagement around the issue of sustainability and of achieving, through that process, an enhancement of environmental citizenship in DMU social media users that would be implemented through pro-environmental behaviours.

As presented in Chapter 4, the researcher joined the Sustainability team at DMU, composed by the Sustainability and Transport officers; with their help a Facebook page and Twitter account were created and used by the Sustainability team initially without a particular strategy. In a second phase, a specific campaign was designed for the scope of the present research.

The campaign design developed in different stages: first, defining the message to be communicated; second, planning the implementation of the campaign itself on social media; and third designing the analysis (and critique) of social media marketing strategies.

The campaign ran for 8 weeks during the month of October and November 2012; the period of intervention was not randomly chosen, but coincided with the beginning of the new Academic Year 2012/13.

The campaign was designed following the theoretical principles of Environmental Citizenship presented in Chapter 3.

Table 13 delineates the topic calendar of the campaign. This was modified several times during the intervention to follow the audience's interests and the feasibility of 'on campus' activities; the agenda has been intentionally kept flexible, following one of the principles of public participation theory which is that participants should have power to influence the agenda of the process (Webler et al. 2001).

1.10 - 7.10	8.10 - 14.10	15.10 - 22.10	23.10 - 28.10
Climate change: The big picture and the global consequences	Climate change: The local consequences	Light and electricity: Implication for the workplace	Heating systems: Implication for the workplace
29.10 - 4.11	**5.11 - 11.11**	**12.11 - 18.11**	**19.11 - 25.11**
Sustainable Food choices: Implication for the workplace	Sustainable Travel choices: Implication for the workplace	Sustainable Water use: Implication for the workplace	Sustainable Waste and resources management

Table 13. The calendar of social media campaign.

The first two weeks were devoted to Climate Change. Different studies about environmental citizenship (Wolf et al. 2009; Seyfang 2006; Horton 2005; Jagers 2009) have shown that one of the prerequisites for pro-environmental action in environmental citizens is their knowledge about climate change. However, the level of knowledge of citizens might be very different. The lowest common denominator was found in the knowledge that the problem exists and that it is human made, suggesting that even basic awareness of anthropogenic causes for climate change was sufficient to empower a sense of personal responsibility and willingness to act (Wolf 2011). Therefore it is here not argued that knowledge about climate change would lead to behaviour change, but that the environmental citizen is aware of the issue and therefore the first step in the creation of an environmental citizen is the establishment of this knowledge.

The idea was to present not only abstract information, but to link the information about climate change to the local context and consequences and to make it appear

real. Therefore, evidence from people witnessing climate change in the UK were shared as an example (Pianosi 2012). During the following weeks the campaign focused on different private-sphere environmentally significant behaviours, as defined by Stern (2000), such as waste disposal, green consumerism, purchase of goods and services with an environmentally significant impact. Although those behaviours are usually considered in households, the intention was to tie these to the institutional context. Therefore a connection with how to implement those actions while at DMU was always offered. Moreover, it was particularly important to explore the links between individual actions and the impact of those, once collective, on the environment, either they were positive or negative actions. As Stern (2000) states the environmental impact of individual behaviour is small, but it becomes significant when they aggregate thanks to many independent individual actions.

5.2.1 Day to day implementation of the campaign

In order to program the publication of Facebook posts and tweets, a calendar of frequency of posting and interaction on the different social networks was created.

5.2.2 Deciding the perfect time

The timing of tweets is one of the most important characteristics on which it depends the popularity and disseminating success of a Twitter account. Twitter used to show posts in chronological order (whereas now it has turned to an algorithm-based system, showing tweets based on interests and other factors[14]), therefore the followers could see one`s post only if they log into Twitter in the moment or shortly after the post was sent. In order to identify the best moment for sending out post on Twitter, it is important to know the time of the day where @SustainableDMU`s followers are most active on Twitter. This is important because the intention was not to repeat the same piece of information for more than once or twice during the

[14] https://blog.twitter.com/2016/never-miss-important-tweets-from-people-you-follow accessed 31st March 2017

week; at the same time the shared information was highly relevant to DMU social media network. Therefore, it was necessary to achieve the maximum audience visibility.

To take this important factor into account an analysis with different online tools have been performed. An initial picture was obtained with Follower Wonk[15] (seeFigure 7), an online Twitter metric tools that among other things gives an analysis of the hours when the followers of an account are most active. More detailed analysis has been used during the campaign to see day by day which was the most active time for followers with Crowdbooster[16] (see Figure 8).

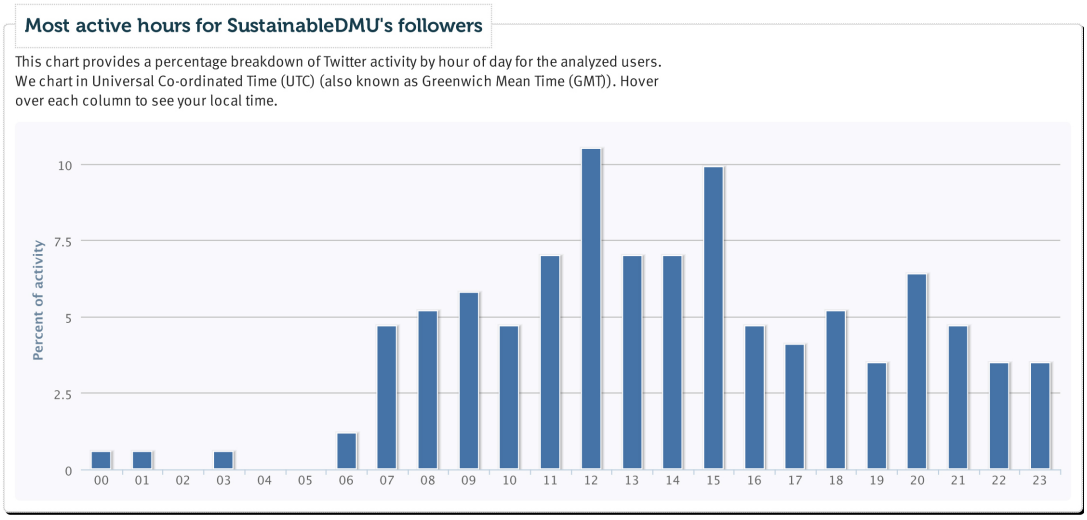


Figure 7. Analysis of most active hours for @SustainableDMU followers. Chart created by Follower Wonk. Retrieved in September 2012.

[15] https://followerwonk.com/

[16] https://crowdbooster.com/

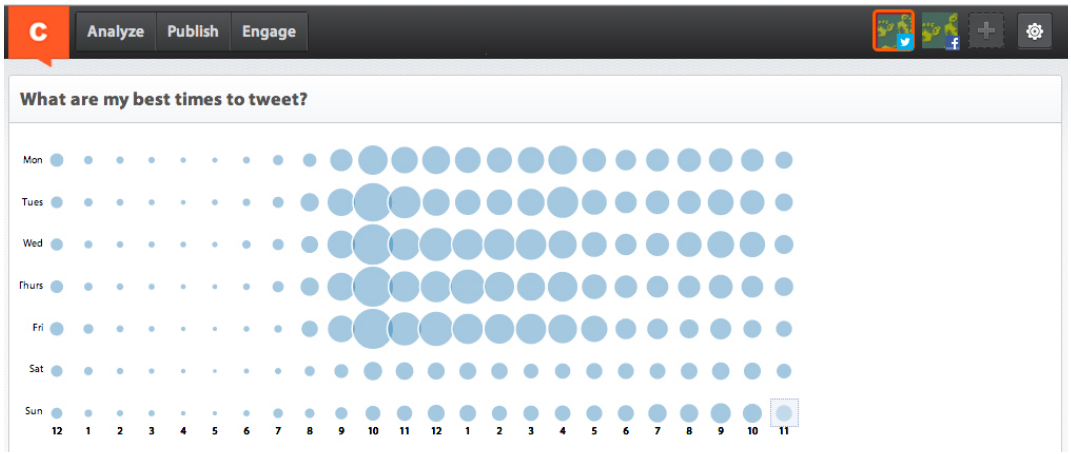


Figure 8. Timing suggestion for @SustainableDMU from Crowdbooster. Retrieved in March 2013

5.2.3 Creating the content calendar

The campaign was organised on thematic weeks. Each topic was introduced on Monday with reference to relevant literature and research and during the week interaction between users was stimulated through active participation to the discussion, introduction of new material to the discussion and of interactive material. Table 14 provides the weekly planned organisation of the discussion on social media. However, activity on social media was deeply constructed around interaction with followers, therefore the schedule was not always followed literally.

As expected, interaction increased during the course of the intervention and publishing, posting, and tweeting followed this increase.

Monday	• Open the discussion about the weekly topic with an engaging question
Tuesday	• Nothing was planned; posting followed interaction with followers and fans.
Wednesday	• Sustain the discussion with a picture or a video (if feasible) • Ask specific action on the issue of the week
Thursday	• Nothing was planned; posting followed interaction with followers and fans.
Friday	• Announce the topic for the next week and ask if there is something participants are unsure of and that they would like to talk about

	• Remind people to switch off appliances before going home for the weekend • Wish a good weekend
Saturday	• Nothing was planned; posting followed interaction with followers and fans.
Sunday	• Storify [17] of the week • Get closure of the discussed topic (what topic was discussed, which were the issues raised, any decisions made, any results achieved)

Table 14. Weekly organisation of the campaign on social media

In total, 811 tweets, 128 Facebook posts, and 112 blog posts were shared from SustainableDMU during the campaign, as shown in Table 15. Both SustainableDMU and the interaction with followers increased throughout the campaign. A deeper investigation about this will be treated in the following sections, which will evaluate the effectiveness of social media tools in creating engagement and conversations.

	Total	**Week 1**	**Week 2**	**Week 3**	**Week 4**	**Week 5**	**Week 6**	**Week 7**	**Week 8**
Tweets	481	25	43	68	63	69	74	65	74
Retweets	174	12	13	37	20	28	23	20	21
Replies	156	11	7	35	13	20	38	13	19
Number of Facebook Posts	190	3	11	17	22	30	39	38	32
Number of likes	128	3	8	15	11	23	23	22	23
Number of comments	62	0	3	2	11	7	16	16	9
Number of posts on the blog	112	4	6	10	13	17	20	19	23

[17] http://storify.com/ Storify is a social storytelling and lets curate social networks to build social stories, bringing together media scattered across the Web into a coherent narrative. Users can search social media networks to find elements about the topic they want to Storify looking through Twitter, Facebook, YouTube, Flickr, Instagram and more to gather material for their stories.

Table 15.Publishing activity of SustainableDMU during the campaign on the different social media tools

5.3 How to define the effectiveness of the social media campaign

The different metrics downloaded have been compared to a 24 weeks period (8 weeks before intervention, 8 weeks of Campaign, and 8 weeks after it); this is not ideal because interaction and activity of users on social media differ deeply according to the period. The Campaign happened at the beginning of the new academic year, a period chosen to make sure that the majority of staff and students would have been on campus and therefore it would have been easier to reach and engage as many of them as possible. On the other hand, both periods before and after were 'non ordinary' period, being 'before' the end of summer holidays and 'after' Christmas time. This is one of the reasons why activity before and after is so inexplicably low.

Having defined effectiveness as the ability of social media to engage people at DMU in conversations around the issues of sustainability, the evaluation of effectiveness investigates the ability of SustainableDMU of attracting more and new people, of engaging them in different actions, and of making them participate in conversations with the account and between themselves. Following a review of the current trend in the evaluation of social media strategies for institutional and governmental use (Howto.gov 2013; Finnis et al. 2011) four main categories have been defined: (1) Growth of community, (2) Engagement, (3) Indicators and (4) Conversations. For each category different metrics have been recorded and compared, as is explained in Table 16.

Metric	**Facebook**	**Twitter**
Growth of community	Growth in the number of Likes	Growth of the number of followers
	Growth in Reach of Page Posts	Growth of social reach
Engagement	Growth in the number of likes, comments, and share to posts	Growth in the number of retweets (message amplification)
	Analysis of the top posts per number of likes, comments, and	Analysis of the top tweets per number of retweets

	share	
	Increase in the number of People Talking about the Page	Increase in the number of mentions
	Growth in the ratio Talking about the Page/Page Fan	Growth in the ratio Retweets, Mentions, Replies/Tweets
	Growth in the number of Active Fans	Growth in the number of Active Followers
	Growth in the ratio Active Fans/Total Fans	Growth in the ratio Active Followers/Total Followers
Content Indicators	Most engaging content	Most engaging content
	Top topics	Top hashtags
Conversations	Analysis of the conversation created (length, number of people interacting, topic discussed)	Analysis of the conversation created (length, number of people interacting, topic discussed)
	Content analysis of conversations	Content analysis of conversations

Table 16. Quantitative social media measurement. Types of interaction measured. Adapted from (Barker et al. 2012; Sterne 2010; Awareness 2012; Finnis et al. 2011; Howto.gov 2013)

The four categories evaluate participation from different points of view:

1. Growth of community. This measure provides insights into the size of the indirect and direct community. Although the success of an account cannot be measured simply by its number of Fans and Followers, the growth in the community size gives an idea of how well the account is attracting new people and it is therefore an indicator of how successful SustainableDMU have been in getting the attention of DMU social media network.
2. Engagement. The measure reveals insights into the volume and frequency of an account's engagement with its Fans and Followers. This is a key category, because it starts identifying trends and defining what produces engagement in response. It also offers insights into the volume of active followers compared to the total number.

3. Content Indicators. This measure is helpful to go deeper into the analysis of trends and topics that draw engagement.
4. Conversations. This is probably the most important measure; it analyses the conversations created from a quantitative point of view (length, number of people interacting, topic discussed) and compares Facebook with Twitter, to see if any difference can be found in the two tools. However, a qualitative analysis of conversation is also sought, to better illuminate the performance and potential of the campaign; the qualitative analysis will be discussed in the following chapter 5.

5.3.1 Growth in community

Metric	Facebook	Twitter
Growth of community size	Growth of the number of Likes (Barker et al. 2012)	Growth of the number of followers (Barker et al. 2012)
	Growth of Reach of Page Posts	Growth of social reach (Awareness 2012)

The extent of an account community is a fundamental metric in analysing its popularity. The growth in the community size is a central indicator of how well the account is attracting new followers. It is in fact often assumed that a growth in followers is indicative of a more effective strategy; although this is assumed to be true, it is necessary to consider this measure in the context of others (Howto.gov 2013). In addition, it is possible to analyse the direct audience, composed by the actual fans, followers and subscribers of the account, and the indirect audience, composed by the sum of all fans/followers/subscribers of the direct audience, which gives an idea of the overall number of people the account is able to reach.

5.3.1.1 Facebook

On Facebook the people who liked the SustainableDMU Page, who are called Fans, compose the direct audience. Total Reach of the Page indicates the indirect audience.

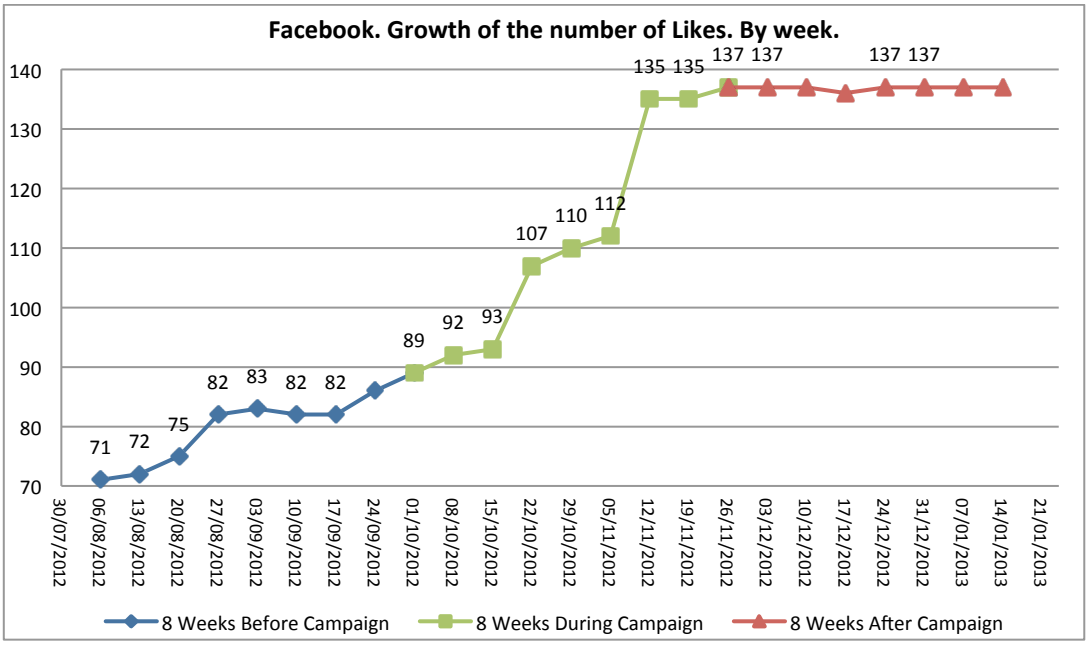


Chart 1. Facebook Page Like. Comparison of before, during, and after campaign. Data retrieved from Facebook.com in April 2013.

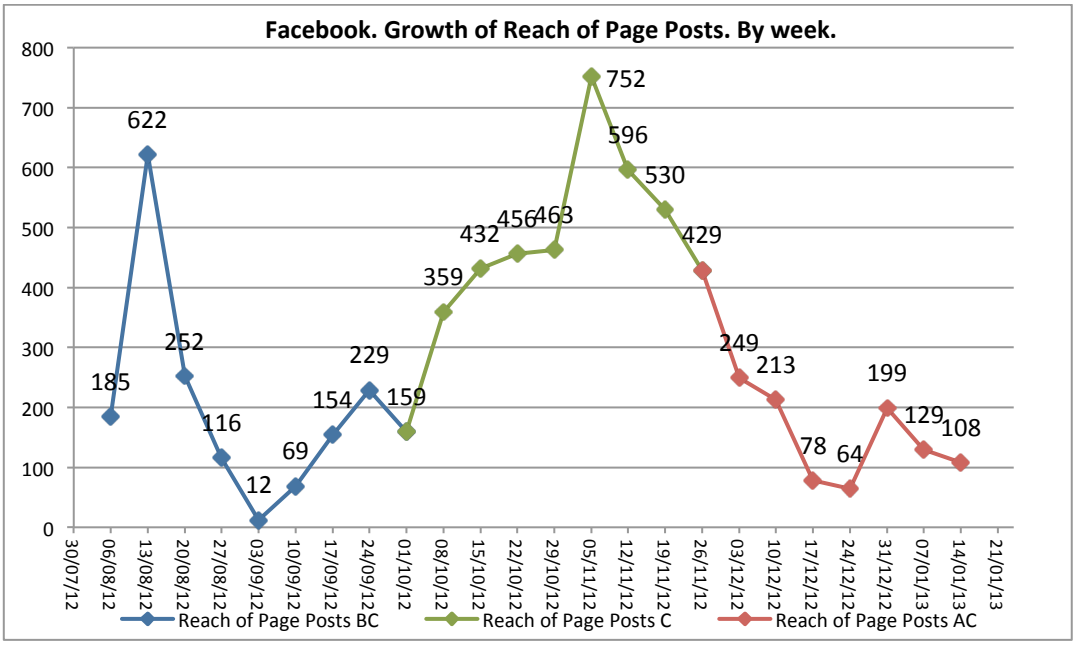


Chart 2. Reach of SustainableDMU Page Posts. Comparison of before, during, and after campaign. Data retrieved from Facebook.com in April 2013.

Chart 1 and Chart 2 show that the community around SustainableDMU on Facebook consistently and greatly grew during and as an effect of the campaign. The direct

audience of Facebook went from 82 to 135 Likes (+65%); the indirect audience increased from 229 to 530 (+131%).

5.3.1.2 Twitter

On Twitter the number of Followers composes the direct audience and the indirect audience is given by the Potential Impressions. Crowdbooster calculates Potential Impressions as the sum of the account followers and the followers of the retweeters for each day.

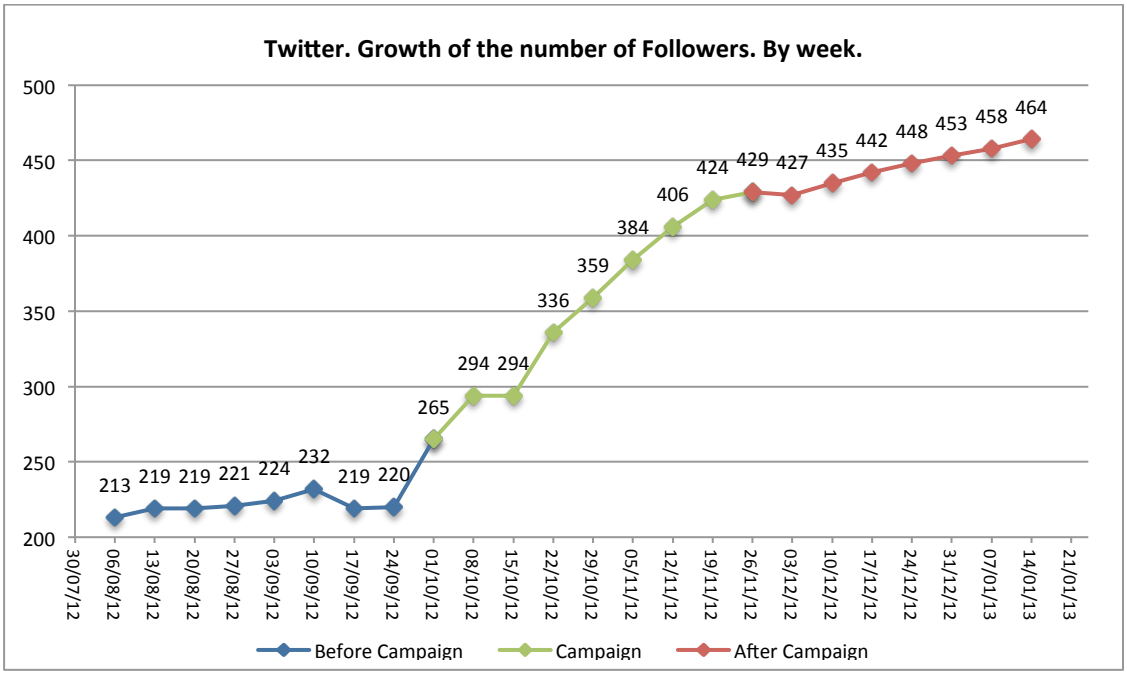


Chart 3. Growth in the number of Followers of SustainableDMU Twitter account. Comparison of before, during, and after campaign. Data tracked with TwitterCounter from August 2012 to January 2013.

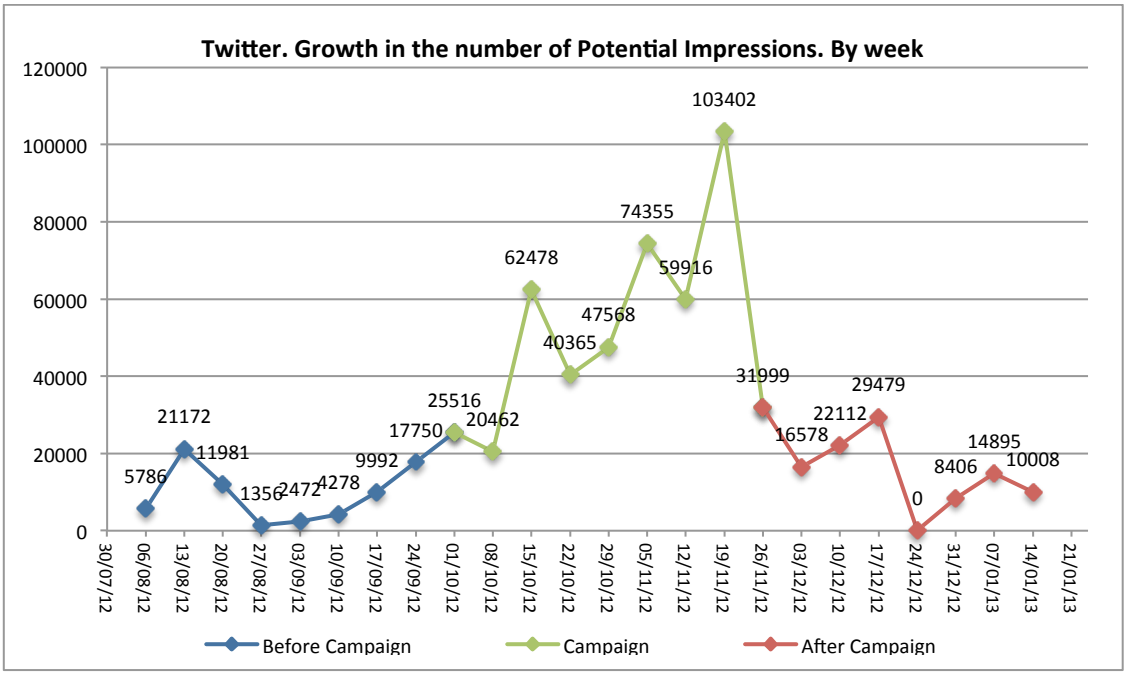


Chart 4. Growth in the number of @SustainableDMU Potential Impressions. Comparison of before, during, and after campaign. Data tracked with Crowdbooster from August 2012 to January 2013.

Similar observations can be done for Twitter. The account community substantially grew during the campaign, as can be seen from Chart 3 and Chart 4. The direct audience started at 265 and arrived at 424 Followers (+60%), while the indirect audience increased from 25516 to 103402 at its highest (+305%).

5.3.1.3 Discussion

The growth in the community size can be explained as an effect of the activity of the account itself. Different activities were directly aimed at enhancing the number of people reached; this was done through 'following' people on Twitter, suggesting the page to friends or colleagues on Facebook, sharing blog posts on both Twitter and Facebook. Those activities were purposefully made to increase the size of SustainableDMU community, but also to hear from them and to exchange messages. Although significant, this is not the only cause of the growth; the increase was consistent throughout the intervention period and not only following the initial addition of followers. The explanation to this is that being consistently active on social media made SustainableDMU more visible on those platforms therefore increasing its potential in attracting new followers. Looking at the figures of growth it

is possible to say that SustainableDMU has been successful in attracting new followers and Fans, due to the high increase in a short period of time.

On the other hand, it is also true, that not all people at DMU were reached (for example the Vice-Chancellor's Twitter account has 8000 followers – 4000 at the time of the research) making it impossible to involve those in the conversation around sustainability. This shows one of the criticisms of social media tools as means of communication: it is not possible to easily reach everyone by simply being active in the open space (on Twitter and Facebook). As such, these tools are not as democratic as they are presented; hierarchy and power relations on social media often mirror what happens in the physical context, making it difficult for a minority to reach the majority of the population.

However, the results indicate that good effort in using and participating with people on social media do increase the popularity of a sustainability-related account. In addition, during the campaign it was possible to perceive the growth in followers and Fans and that was repeatedly reported by both the Sustainability and Travel Officers (who were initially administrating the accounts).
Nevertheless, an analysis of the interaction created was necessary to understand better what were the factors that made SustainableDMU more popular during the campaign.

In addition to the quantitative enlargement of the audience size, another issue was still unresolved: if social media allow to reach a more diversified audience, e.g. to involve all the interested parties. Further insights will be gained on this through the qualitative analysis of the audience, which will be discussed in Chapter 6.

5.3.2 Engagement

Engagement provides insights into the volume and the frequency of an account participation with its audience and this is the main measure for SustainableDMU due to the overall aim of the campaign.

The following table was introduced in Section 5.3 and presents the analysed metrics.

Metric	Facebook	Twitter
Engagement and conversations	Most engaging content	Most engaging content
	Growth in the number of likes, comments, and share to posts (Barker et al. 2012)	Growth in the number of retweets (message amplification) (Barker et al. 2012)
	Growth in the number of wall posts by followers (Barker et al. 2012)	Increase in the number of mentions (Sterne 2010)
	Increase in the number of Page Consumers and in Page Consumption	Growth in number of new conversation started from followers (Barker et al. 2012)
	Growth in the ratio Page Consumer/Page Fan	
	Analysis of the conversation created (length, number of people interacting, topic discussed)	

5.3.2.1 Facebook

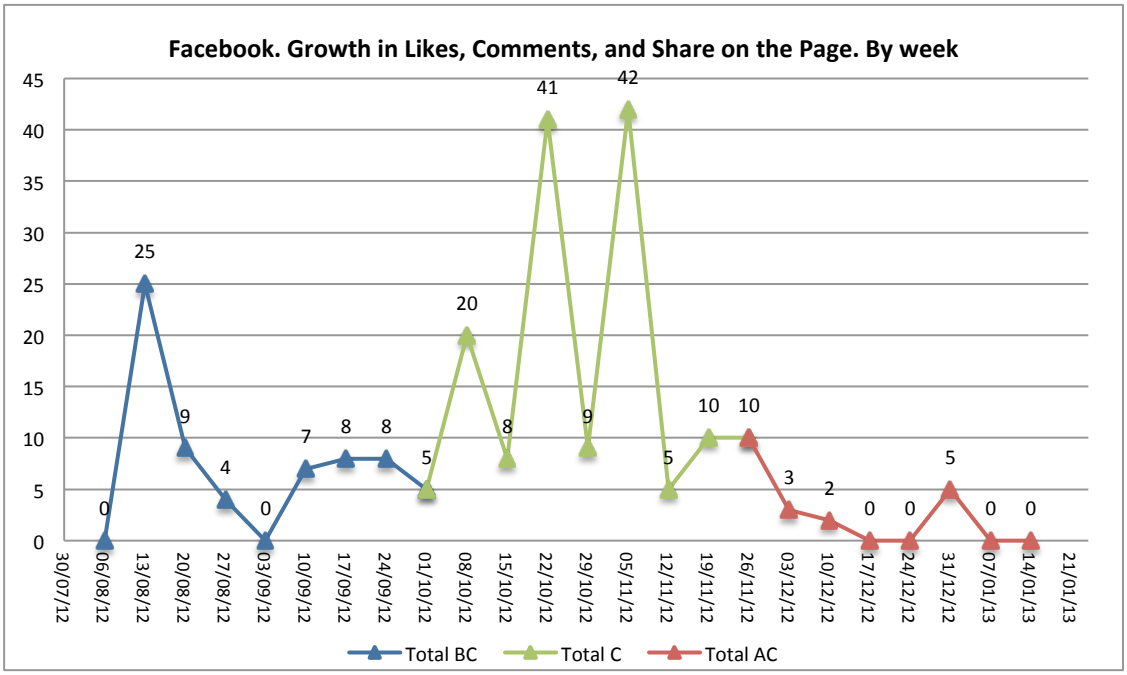


Chart 5. Likes, Comments, and Shares on SustainableDMU Page posts. Comparison of before, during, and after campaign. Data retrieved from Facebook.com in April 2013

Chart 5 shows how comments, likes and shares sensibly increased on SustainableDMU page posts during the campaign. It also shows that during the period following the campaign the interaction decreased sharply, to a level that is lower than previous to the campaign. This has two possible explanations: (1) Being Christmas time less people were attending DMU and has such engagement would have diminished anyway; (2) Failing to achieve the same level of publishing than during the campaign caused Fans to become less engaged with SustainableDMU Page. This is a indication that to foster engagement and interaction continuous publishing from social media managers is necessary.

The first clear cause of the higher number of activity on the Page is that it was due to a higher activity in posting from the Page itself.

Before Campaign	06.08.12	13.08.12	20.08.12	27.08.12	03.09.12	10.09.12	17.09.12	24.09.12
	0	12,5	9	4	0	7	4	1,1
During	01.10.12	08.10.12	15.10.12	22.10.12	29.10.12	05.11.12	12.11.12	19.11.12

Campaign	2,5	2,5	0,5	3,7	0,4	1,8	0,2	0,4
After Campaign	26.11.12	03.12.12	10.12.12	17.12.12	24.12.12	31.12.12	07.01.13	14.01.13
	2	1,5	1	0	0	2,5	0	0

Table 17. Comments, likes, and shares per post. Comparison of before, during, and after campaign. Data retrieved from Facebook.com in April 2013.

Table 17 shows the number of comments, likes, and shares per post on the Page. As expected the number per post are lower during the campaign, due to the increased publishing activity of SustainableDMU. However, it has never been very high in other periods. And although low per post, what the research was aiming at was an increase in interaction from Fans with the content on the Page, which was in absolute terms achieved.

Although activity per post did not increase during the campaign, there is a correlation between the activity on the page, or the number of posts published, and new Fans gained.

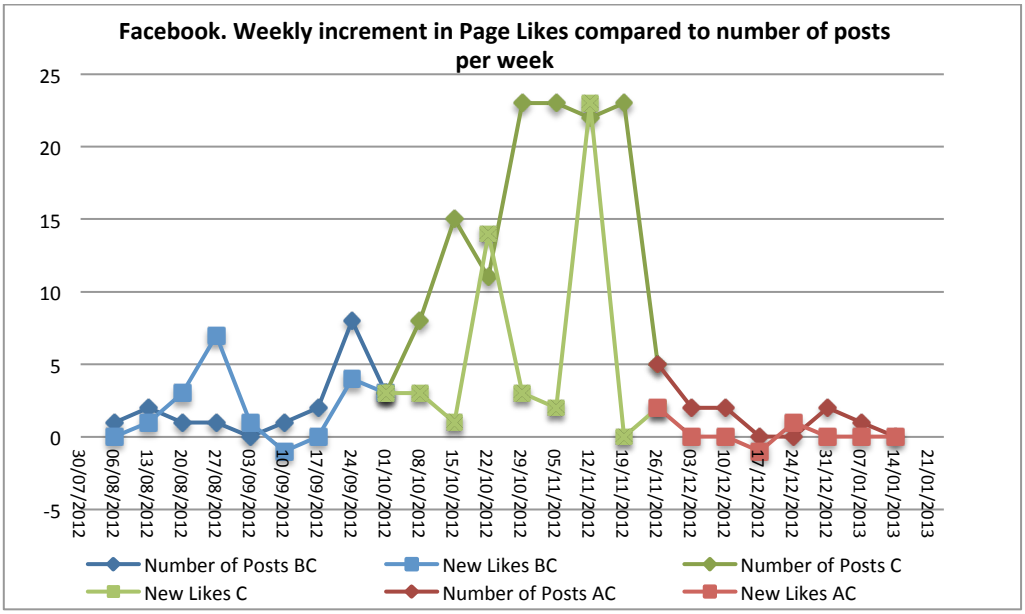


Chart 6. SustainableDMU Page Likes weekly increment compared to the number of posts per week on Page. Comparison of before (BC), during (C), and after campaign (AC). Data retrieved from Facebook.com in April 2013.

Chart 6 shows the increase of Likes of the page compared to the number of posts published and it is evident that Likes are influenced by activity. The visibility of the

Page increased during the Campaign, so that a higher number of people were more likely to see it and therefore to Like it. Moreover the fast decrease in Likes after the end of the Campaign (a consequence of the fast decrease in Facebook activity by SustainableDMU) suggests that the visibility of the Page dropped. In addition, the fact that Fans were lost on the week of the 10.09.12 and the one of the 17.12.12 when SustainableDMU was the least operative suggests that people enjoy an active page, and as such drop off if the Page does not foster interaction.

Table 18 shows the top five posts on SustainableDMU page during the campaign and it is possible to see that they correspond to the peaks in Chart 5.

Date	**Post**	**Post caption**	**# of comments, likes, and shares**	**Topic**	**Type of post**
12.11.12	P1	Good morning DMU! How are you feeling with this brand new week ahead of you? Don't forget to make it green! And why not starting with trying some vegetarian recipes and join us in a new Meat Free Monday? We are also talking about sustainable water this week. Water security, water conservation at home and at uni. Many tips and conversation topics. Talking about sustainable water. Are you familiar with the concept of water security?	36	Sustainable Food choice	Post with link
22.10.12	P2	We're launching an energy efficiency experiment in the Institute of Energy and Sustainable Development De Montfort University Leicester (DMU)! Evaluating if the constant hot water boiler is more efficient for boiling water for making tea and coffee than the usual kettle in an office. You'll like it!	18	Light and electricity, DMU	Post with link
09.11.12	P3	DMU was awarded 3 Green Gowns awards this week for its work on sustainability issues. The awards were in the category of Greening ICT for the Greenview mobile phone app and in the category of Social Responsibility for The Square Mile project. The Square Mile	18	DMU	Post with Picture

		project also picked up the International Social Responsibility award too.			
01.10.12	P4	We are today introducing climate change! Is the climate really changing? What are the observed changes? And are humans causing it? We`d like to hear your thoughts!	17	Climate Change	Post with link
08.10.12	P5	The new Estates electric van is here!! Helping to cut our costs and emissions :-)	14	Sustainable Travel, DMU	Post with picture

Table 18. Top 5 posts on SustainableDMU Facebook page for number of comments, likes, and shares during the campaign

Chart 5 also shows that during the week of the 13th of August there was a peak in activity on the SustainableDMU Facebook page; the post the activity is related to is presented in Figure 9.

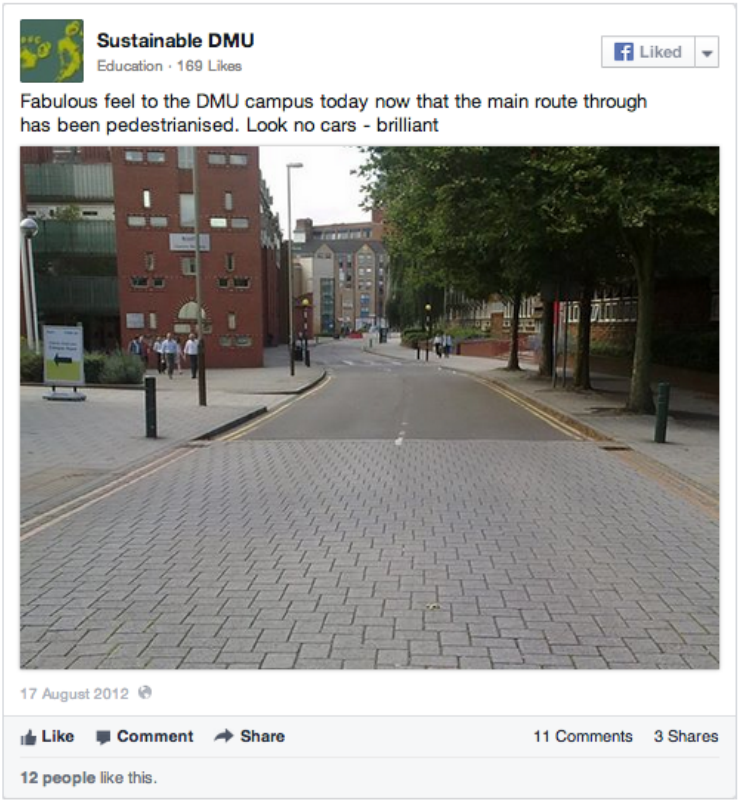


Figure 9. SustainableDMU Facebook post on the 13th of August 2012 (Retrieved in September 2013)

The post presents a "great event" at DMU: the pedestrianisation of Mill Lane, the route that goes through campus. The post obtained many likes and comments, not

only from people who were already Fans of SustainableDMU, but also from people outside its audience, but who were related to DMU. The engagement around the post has been therefore very high, because it was a topic highly relevant to DMU users.

As can be seen from Table 18, three of the Top Five Posts on the Facebook page were also posts talking about events or activities at DMU. This shows that people are more likely to be engaged when the post is highly relevant to them. Which is the same reason P1 has been so engaging (see Figure 10). It was a Monday morning post introducing the topic of the week, which was Sustainable Use of Waster, and encouraging people to take part in Meat Free Monday, a non profit initiative founded in 2003 that was introduced in Sustainable Food Week to encourage staff and students to eat less meat. The post triggered a conversation between SustainableDMU and 5 Facebook Fans (as shown in Figure 36), page 191 who contributed with their knowledge, experiences, and opinions, around the issue of eating less meat for environmental and health-related reasons, which went on for three days. This was a clear example of engagement and conversation happening on social media.

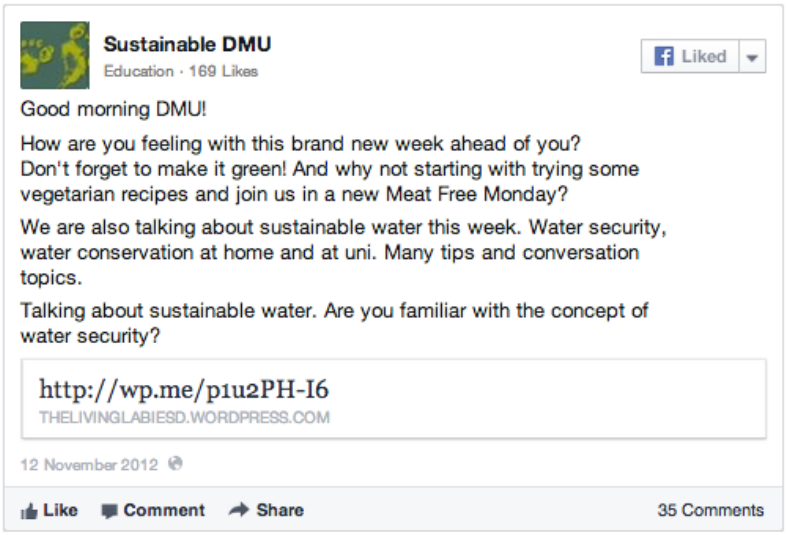


Figure 10. SustainableDMU Facebook post on the 12th of November 2012 (Retrieved in September 2013).

If we look at the correlation between the Page Fans and the activity on the Page it is clear that there is a linear correlation. When activity increases Page Likes also

increase; it is however unclear which metric influence the other. It is possible that activity increases because Page Likes have increased. A reinforcement of this hypothesis comes from the analysis of Chart 7, which compares Page Likes and People Talking about the Page.

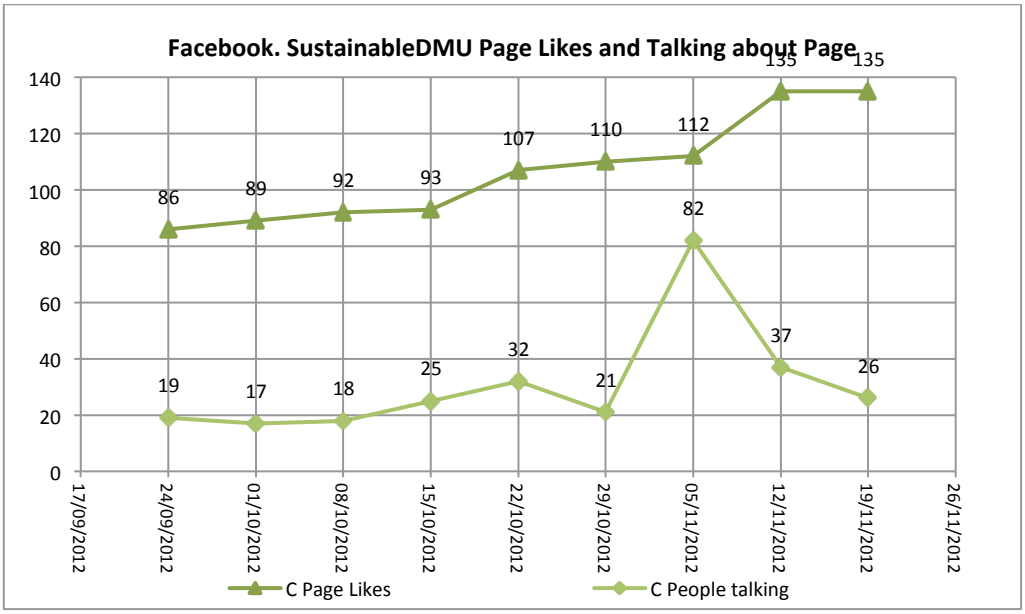


Chart 7. SustainableDMU Page Likes and People Talking about it. During campaign (C). Data retrieved from Facebook.com in April 2013.

People talking about a Page is defined by Facebook as '*the number of people sharing Stories about the Page*' (see Chart 8 to see the trend in People Talking about the Page metric and Chart 9 to see the trend in Stories created). A Story can include liking the Page, posting to its Timeline, liking, commenting or sharing posts, responding to events, mentioning or tagging the Page (Facebook.com 2013). This metric is particularly important because it tells how well the page is engaging with its Fans. The metric tracks unique users interacting over a seven-day period; this means that if the same person generates more than one story it adds only one point to this measure. Moreover, this metric tracks actions that will result in the creation of a story in the Fan Feeds; this means that whenever people create stories the Page reaches a broader audience. Chart 7 shows how in the two weeks of the campaign, when more people were 'talking about' SustainableDMU, the Page Likes also increased. It is

therefore possible to hypothesise a positive correlation between the activity on the Page and its potential in attracting new Fans.

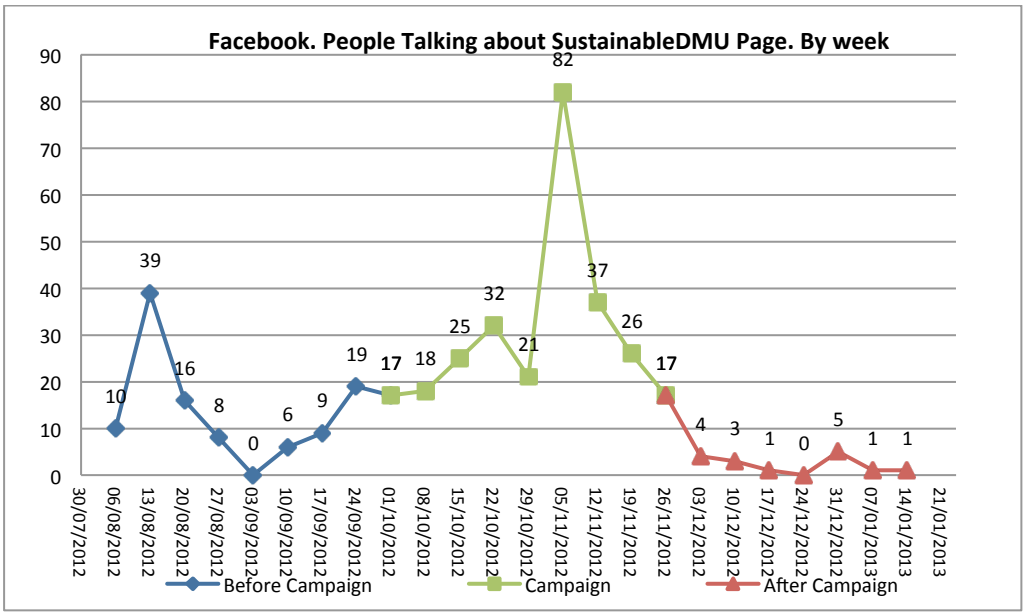


Chart 8. People Talking about SustainableDMU Page. Comparison of before, during, and after campaign. Data retrieved from Facebook.com in April 2013

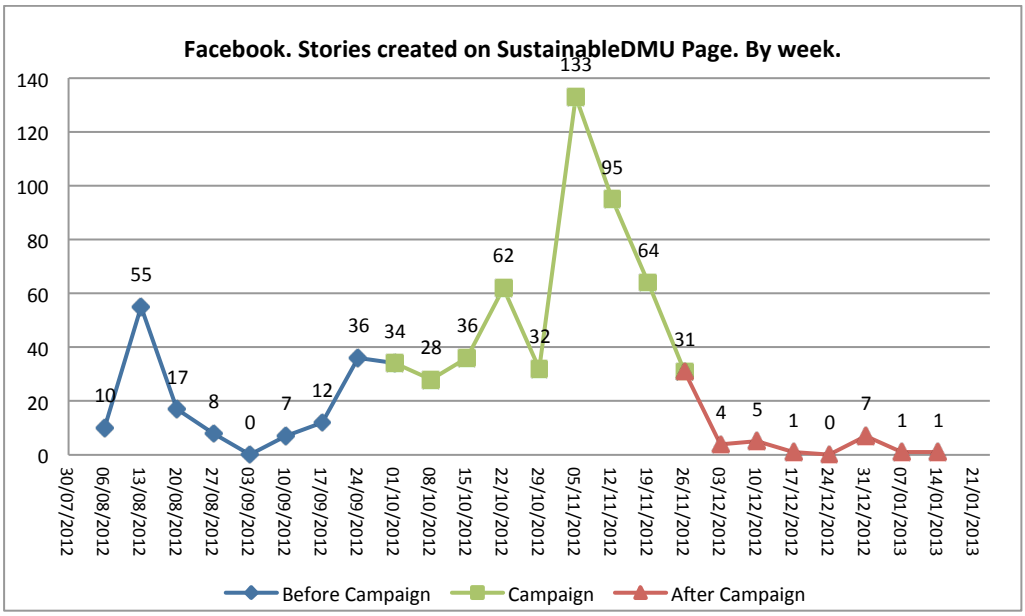


Chart 9. Stories created on SustainableDMU Page. Comparison of before, during, and after campaign. Data retrieved from Facebook.com in April 2013.

People Talking about the Page metric is particularly important because it tells how well a Page is engaging its Fans. In fact it shows how many people are sharing, commenting, and liking content about the Page. To have a better idea it is possible to

analyse the ratio between People Talking about the Page and the Page Fans, obtained by dividing the first metric by the second. This tells how many of the Fans engaged on a weekly basis with content on the Page and therefore it is an important insight in the analysis of engagement on the Page.

Before Campaign	06.08.12	13.08.12	20.08.12	27.08.12	03.09.12	10.09.12	17.09.12	24.09.12
	14,1%	54,2%	21,3%	9,8%	0,0%	7,3%	11,0%	22,1%
During Campaign	01.10.12	08.10.12	15.10.12	22.10.12	29.10.12	05.11.12	12.11.12	19.11.12
	19,1%	**19,6%**	**26,9%**	**26,9%**	**19,1%**	**73,2%**	**27,4%**	**19,3%**
After Campaign	26.11.12	03.12.12	10.12.12	17.12.12	24.12.12	31.12.12	07.01.13	14.01.13
	12,4%	2,9%	2,2%	0,7%	0,0%	3,6%	0,7%	0,7%

Table 19. People Talking About Page/Total Page Fans ratio. Comparison of before, during, and after campaign. Data retrieved from Facebook.com in April 2013

Table 19 shows how the engaged users during the campaign have increased. It also shows that the higher activity on the page was not only a consequence of an higher activity on the Page, but that Fans were more engaged in liking, commenting and sharing during the campaign, which is per se a consequence of a more engaging and active Page. The number of people engaging with the content on the Page, and therefore engaging with issues related to sustainability, has increased during the campaign period. As such it means that sustainability was a more popular topic of discussion in DMU social media network.

5.3.2.2 Twitter

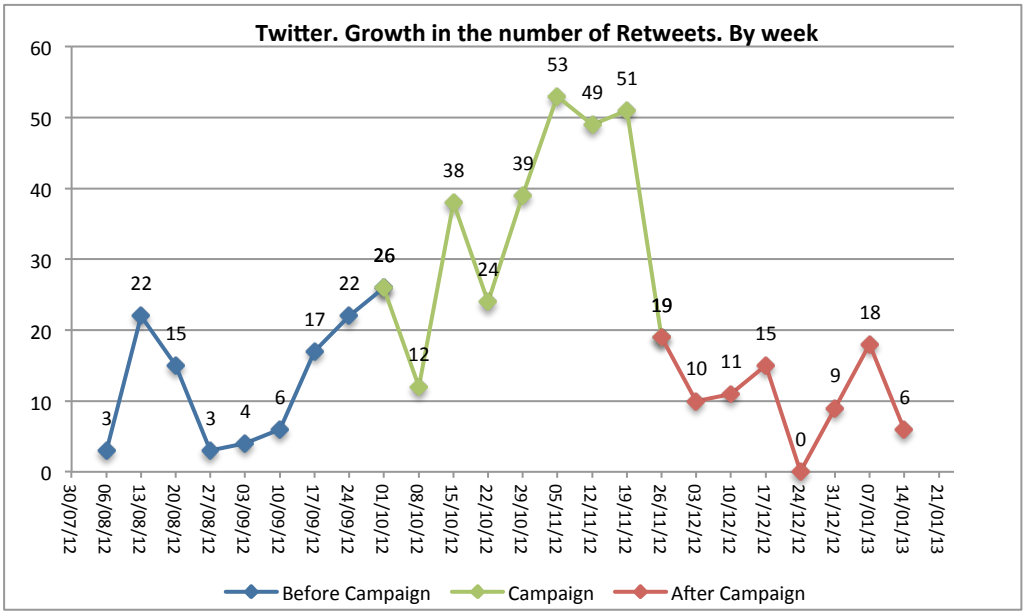


Chart 10. Growth in the number of @SustainableDMU Tweets retweeted. Comparison of before, during, and after campaign. Data tracked with Crowdbooster from August 2012 to January 2013.

On Twitter, retweets have highly increased during the campaign, as shown in Chart 10. Retweets are an important part of Twitter, because they can largely increase the Reach of one's account. If many people or people with a high number of Followers retweet someone's tweet the information can spread rapidly and 'go viral[18]', that is reach hundreds or thousands of people in few minutes.

Table 20 shows the Top Five most retweeted SustainableDMU's tweets during campaign. In parallel with what happened on Facebook, three out of the five most retweeted tweets were about DMU, therefore a topic directly relevant to the DMU social media community around SustainableDMU. As on Facebook, the most relevant topic to DMU social media network has been DMU itself.

[18] 'Go viral' - used in reference to Internet content which can be passed through electronic mail and social networking sites (Facebook, etc.): an image, video, or link that spreads rapidly through a population by being frequently shared with a number of individuals has 'gone viral'. Definition by (Urbandictionary.com 2009)

Date	Tweet	Retweets	Potential Impressions	Topic	Type of Tweet
03.10.12	Are you lugging your mug for #dmulugamug to get your 10p discount and reduce waste? Lets see the evidence. Show us your mug! #onelesscup	7	4948	Sustainable Resource Management, DMU	Tweet
16.10.12	It's World Food Day today! Think of what you eat, where it comes from how it affects farmers & communities! #sustainability #WFD2012 @FAOWFD	5	2140	Sustainable Food	Tweet
02.11.12	Next week we would like to talk about #green transport @dmuleicester! Please let us know if there is something you'd like to discuss about!	5	1032	Sustainable Transport, DMU	Tweet
19.11.12	#Sustainable #Waste #Management http://t.co/jkzyKQFp What is more important #reducing or #recycling? #DMU #dmuWaste	5	20231	Sustainable Waste Management	Tweet with link
23.11.12	If you`re a Twitter/environment enthusiast(or both) & would like to help Monica with her research please let us know! She`s looking for chatty people	5	4089	DMU	Tweet

Table 20. Top Five retweeted tweets of @SustainableDMU in the campaign period. Data tracked with Crowdbooster from August 2012 to January 2013

What it is also noteworthy is that the most retweeted SustainableDMU tweet has been the one talking about the pedestrianisation of the central road in DMU campus (see Figure 11), as on Facebook.

Figure 11. The most retweeted SustainableDMU tweet of all time. Data retrieved from Twitter on September 2013.

In Table 20 is also possible to see that tweets with a higher number of retweets not always also have the highest reach (or Potential Impressions), due to the number of followers of the retweeters (see Figure 12 and Figure 13). Retweets extend the reach of the account, making it possible for new users to see the tweets and therefore making it possible for new people to follow the account. On the other hand, what is important is not only the number of people that the account could potentially reach, but the actual number of people interacting with the account. Therefore, the two measures are more valuable when combined together for insights. What is most relevant to the analysis of participation around SustainableDMU is when many users

from DMU retweet SustainableDMU's tweets, because it extends SustainableDMU's reach within DMU social media network, which is the aim of the research.

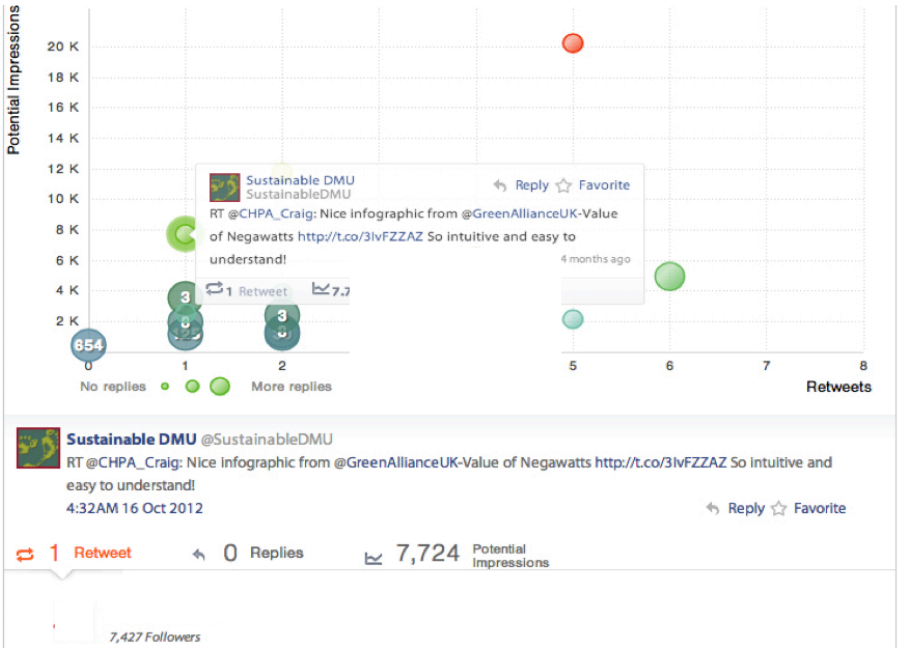


Figure 12. Potential Impressions of 1 retweet from an influential follower. Data downloaded from Crowdbooster in March 2013.

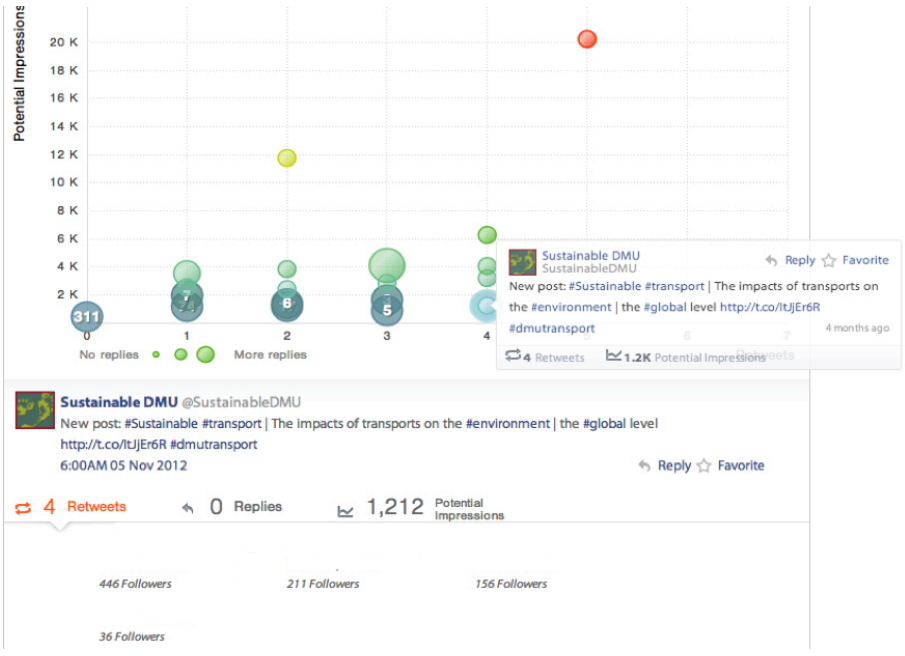


Figure 13. Potential Impressions of 4 retweet. Data downloaded from Crowdbooster in March 2013.

Although Retweets are relevant to understanding the reach of SustainableDMU on Twitter and are a first measure of engagement, what is more insightful in order to

understand the participation are the conversation created. The number of Mentions, that is when a user mentions SustainableDMU in its tweets, is the initial metric that allowed to understand how many conversations were created.

Chart 11 shows the growth in Mentions throughout the 24 week period. The increase have been higher in the last two weeks of the campaign, suggesting that either the discussed topics (water and waste) were more interesting to the Twitter audience, or that after interaction has been going on for a while the audience started enjoying the conversation with SustainableDMU. The second hypothesis seems quite likely considering that Mentions kept being high (higher than before the campaign) after the end of the intervention. Moreover, Retweets have been also quite high during the same two weeks.

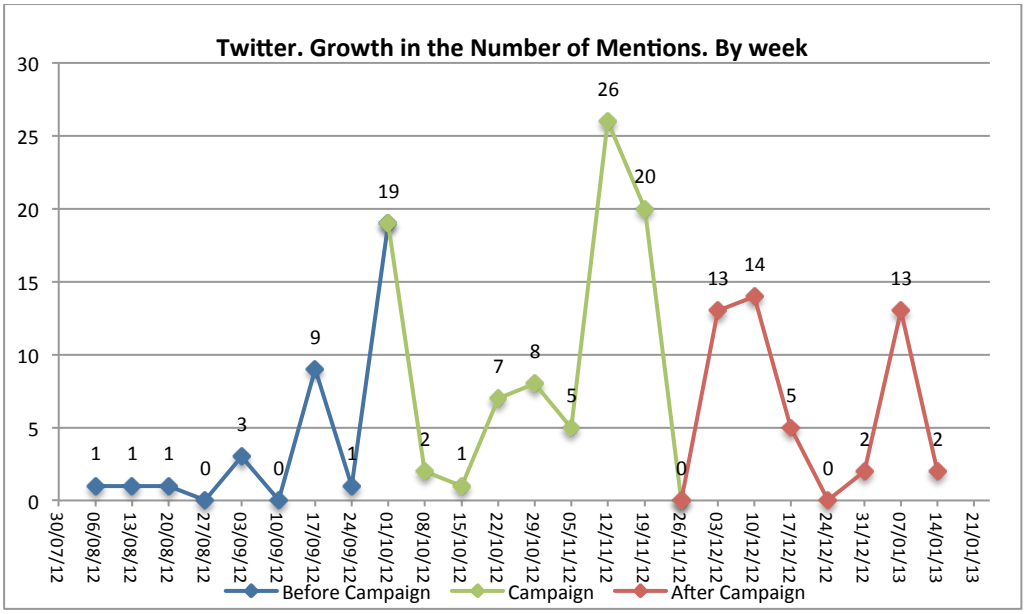


Chart 11. Growth in the number of @SustainableDMU Mentions. Comparison of before, during, and after campaign. Data tracked with Crowdbooster from August 2012 to January 2013.

Table 21 shows the Retweets, Mentions and Replies ratio, which is the number of retweets, replies and mentions by SustainableDMU followers divided by the number of tweets from SustainableDMU.

Before Campaign	06.08.12	13.08.12	20.08.12	27.08.12	03.09.12	10.09.12	17.09.12	24.09.12
	0,38	0,46	0,71	0,40	0,63	0,58	0,48	0,39

During Campaign	01.10.12	08.10.12	15.10.12	22.10.12	29.10.12	05.11.12	12.11.12	19.11.12
	0,54	**0,19**	**0,34**	**0,31**	**0,40**	**0,48**	**0,45**	**0,45**
After Campaign	26.11.12	03.12.12	10.12.12	17.12.12	24.12.12	31.12.12	07.01.13	14.01.13
	0,38	0,57	0,42	0,71	0,00	0,71	0,55	0,21

Table 21. Retweets, Mentions, and Replies ratio. The number of retweets, replies, and mentions by followers divided by the number of tweets from SustainableDMU by week.

As it can be seen it is not possible to talk of an increase in the ratio, however the ratio have been steady during the 8 weeks of campaign, especially in the last four weeks, when participation increased. The ratio also stayed high after the campaign, which is a very good result. It can also be said that although the increase in the ratio has been low, there has been a very large increase in the number or tweets from SustainableDMU; that means that engagement and participation in discussion with SustainableDMU have largely increased.

Chart 12 shows the Engaged Users in the SustainableDMU Twitter network. Engaged Users is not a metric tracked by any of the social media mining tools used during the intervention; however, it has been considered important to create a metric similar to the People Talking about the Page metric on Facebook. Therefore the Engaged Users is a measure of the people who have retweeted, mentioned, or replied to SustainableDMU in the analysed period. It gives therefore insight into how many people were interacting with SustainableDMU and therefore it tells how well SustainableDMU was engaging its followers.

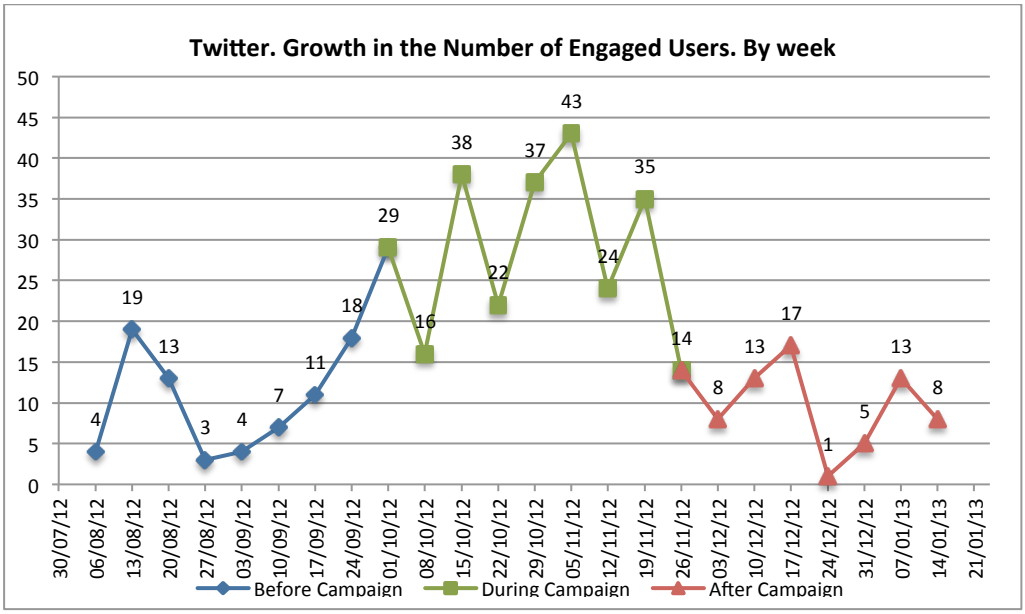


Chart 12. Growth in the Engaged Users around SustainableDMU. Comparison of before, during, and after campaign. Data tracked with Crowdbooster from August 2012 to January 2013.

From Chart 12 it can be seen that there has been an increase in the number of engaged users around SustainableDMU. The previous to intervention peak is relative to the already mentioned participation around the pedestrianisation of Mill Lane (Figure 11). A stronger indication of participation is shown in Table 22 thanks to the interaction rate, that is the number of users who were interacting divided by the number of followers.

Before Campaign	06.08.12	13.08.12	20.08.12	27.08.12	03.09.12	10.09.12	17.09.12	24.09.12
	0.02	0.09	0.06	0.01	0.02	0.03	0.05	0.08
During Campaign	01.10.12	08.10.12	15.10.12	22.10.12	29.10.12	05.11.12	12.11.12	19.11.12
	0.11	**0.05**	**0.13**	**0.07**	**0.10**	**0.11**	**0.06**	**0.08**
After Campaign	26.11.12	03.12.12	10.12.12	17.12.12	24.12.12	31.12.12	07.01.13	14.01.13
	0.03	0.02	0.03	0.04	0.00	0.01	0.03	0.02

Table 22. Interaction rate of SustainableDMU followers. The number of users who were interacting divide by the number of followers by week.

This metric increased during the campaign and provides key insights, because it tells how many SustainableDMU's followers were participating in conversation with it. And

therefore it tells if SustainableDMU was sharing content that was interesting and engaging and therefore people felt motivated to participate in discussion.

5.3.2.3 Discussion

Comparing Table 22 with Table 19, it is possible to see how engagement on Twitter have been lower, although (or because) the number of followers was a lot higher on Twitter than on Facebook. And even though the perception of the researcher was that during the implementation of the campaign most of the conversations were happening on Twitter. This may be due to the fact that Fans on Facebook were more interested in the topics discussed and therefore more likely to engage, but also to the intrinsic characteristics of the two platforms. As already mentioned, tweets have a very short life, because Twitter used to show tweets in a chronological order and because the amount of information shared is generally vast; in a matter or few minutes, if not seconds, they can disappear from the Twitter feed, depending on the number of people one is following. Therefore it is very easy that a tweet gets 'lost' and the only hope is that someone would reply or retweet it, extending its life, another reason why retweets are so important. On Facebook instead, it is possible to manage the importance of the post, highlighting it if necessary, or making it stick to the top of the Page. Moreover, posts are always visible on the user's Page and do not run away as fast as on Twitter.

5.3.3 Content Indicator

To be able to draw conclusions on the ability of social media to generate conversations is necessary to reflect on the characteristics that make a post/tweet more or less 'successful'. This is correlated with the topic of the post/tweet or with the nature of the post itself; e.g. was it a simple status update, or did it have a picture or link?

This section analyses data during the period of the campaign.

5.3.3.1 Facebook. Type of post

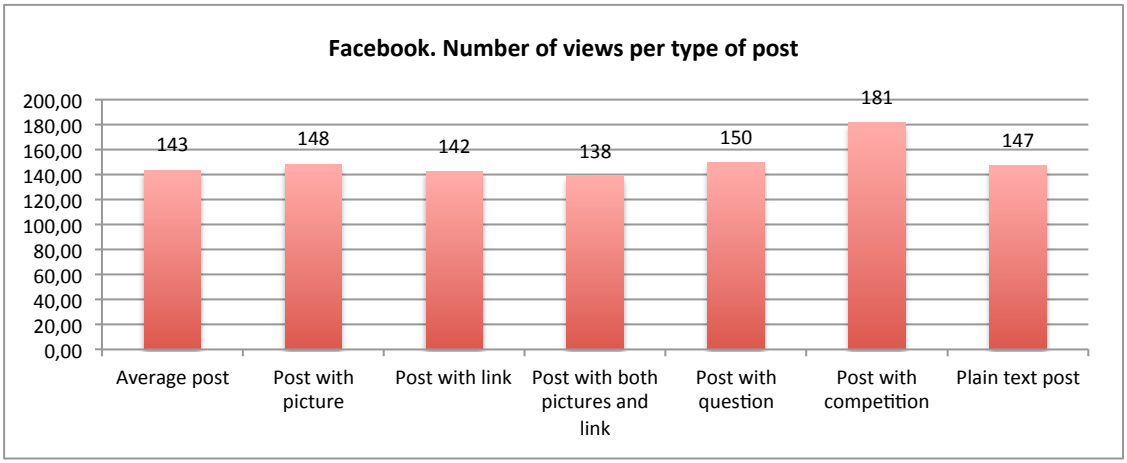


Chart 13. Number of Views of SustainableDMU post by type. Data retrieved from Facebook.com in April 2013.

Chart 13 shows that there is not a large difference in visibility of posts depending on the type. Things are instead more interesting when we analyse the number of actions (Comments, Likes and Shares) by type of post (see Chart 14).

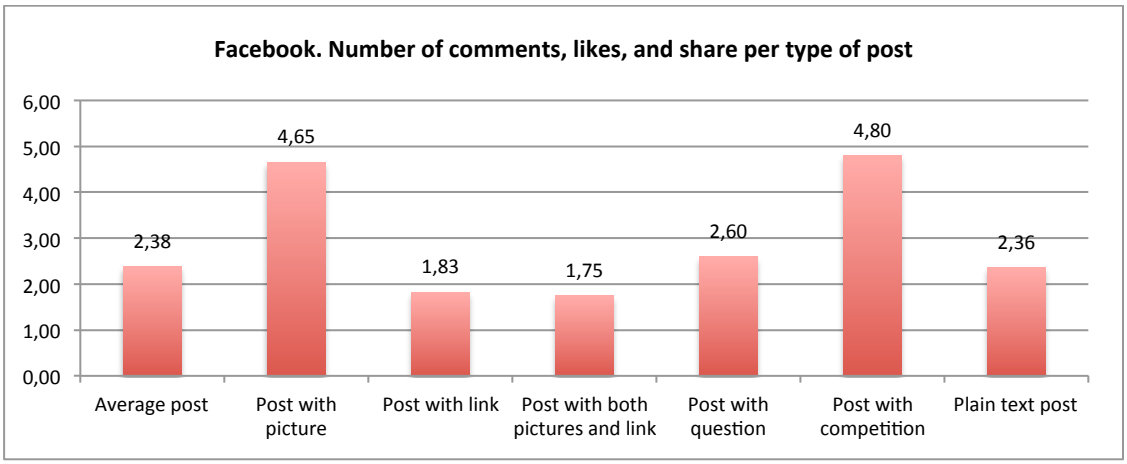


Chart 14. Number of Likes, Comments and Share of SustainableDMU post by type. Data retrieved from Facebook.com in April 2013.

Posts with competition (see for example Figure 17) have a higher number of interactions, followed by posts with picture (see Figure 16).

Figure 14. SustainableDMU Facebook picture and competition post on the 9th of November 2012. Data Retrieved in September 2013.

Figure 15. SustainableDMU Facebook picture and competition post on the 24th of October 2012. Data Retrieved in September 2013.

Although the posts have a number of views that is on average, the engagement that they create is more than 3 times higher than the general post. This is in line with the social media marketing literature, which suggests to add visual content, a strong call to action, or a reward in the posts to increase interaction.

5.3.3.2 Facebook. Topic of post

Chart 15 and Chart 16 show how the topic also influences the popularity of a post on Facebook. Following DMU, the topics that drove the most interaction have been electricity and food. Electricity Week was the third week of the campaign, and therefore a week where it was expected to be a lower interaction, because the campaign was just started. However, most of interaction of posts regarding electricity was related not to the posts during Electricity Week, but rather to the posts relating the 'Kettle vs Hot Tap Experiment', one of the best outcomes of the campaign which will be investigated further in the next chapters.

Regarding the other most popular topic, the sustainability of food, it is not a surprising outcome of the campaign; as already mentioned in Section 5.3.1.1, there has been a long conversation (Figure 36) around the issue of eating meat which went on during the seventh week. Therefore, also in this case most of interaction was not driven by the topic of the week, but from the free engagement of participants.

The views (Chart 15) are similar for all topics, with slightly higher numbers for water and waste, which have been respectively weeks seven and eight of the campaign. As observed previously, this was due to the increased number of Fans of SustainableDMU Page and to the fact that engagement on the page increased particularly during the last three weeks of campaign.

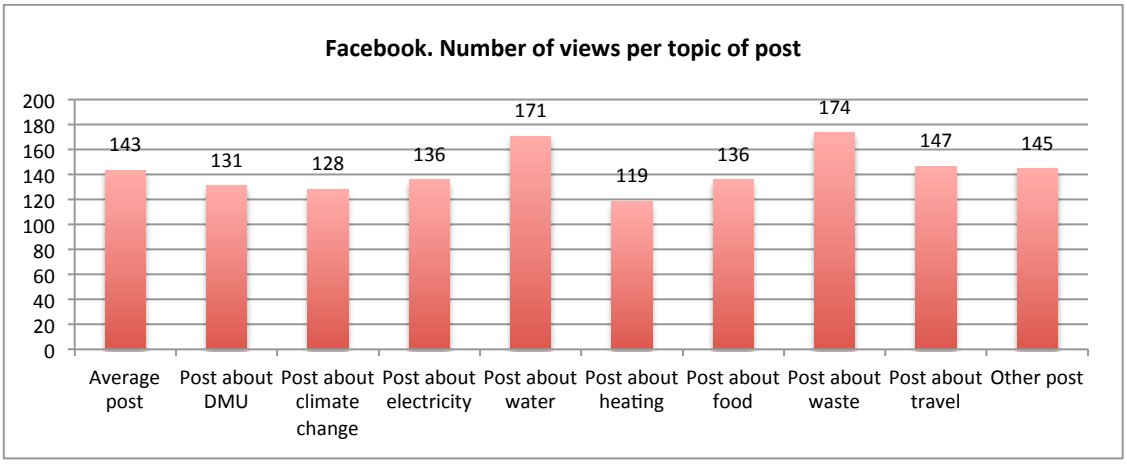


Chart 15. Number of Views of SustainableDMU post by topic. Data retrieved from Facebook.com in April 2013.

However, it is remarkable to see how different interaction is (Chart 16): the post that shared content related with DMU had a higher interaction than other posts. This relates back to Table 18 and Table 20, where it could be seen that the majority of the top five posts/tweets were talking about DMU. This is therefore not only true for the highest visible posts, but also on average. A confirmation that the content shared needs to be relevant to the audience.

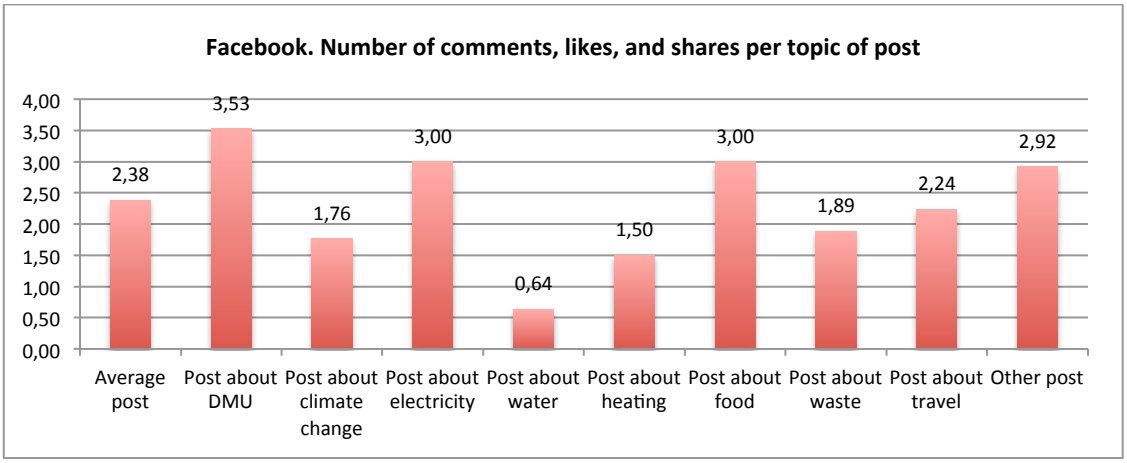


Chart 16. Number of Comments, Likes, and Shares of SustainableDMU post by topic. Data retrieved from Facebook.com in April 2013.

Following DMU, the topics that drove the most interaction have been electricity and food. Electricity Week has been the third week of the campaign, and therefore a week where it was expected to be a lower interaction, because the campaign was just started. However, most of interaction of posts regarding electricity was related not to

the posts during Electricity Week, but rather to the posts relating the 'Kettle vs Hot Tap Experiment' (Figure 31).

Regarding the other most popular topic, the sustainability of food, it is not a surprising outcome of the campaign; as already mentioned, there has been a long conversation around the issue of eating meat which went on during the seventh week (see Figure 36). Therefore, also in this case most of interaction was not driven by the topic of the week, but from the free engagement of participants.

5.3.3.3 Twitter. Type of tweet

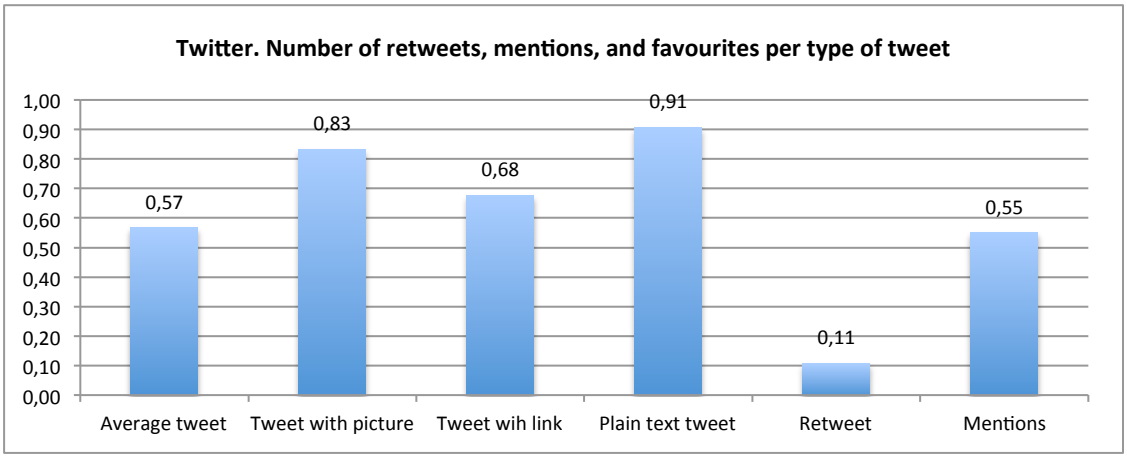


Chart 17. Number of Retweets, Mentions, and Favourites of SustainableDMU tweet by type.

Chart 17 shows that the tweets that foster the most interaction are plain text tweet, with a factor of 0.91, which means that only one plain text tweet in ten is shared without promoting a reaction, being it a retweet, a mention, or a favourite. However, the metric for the average tweet is also quite unpredicted: 57% of tweets encouraged interaction. Overall, only retweets did not work very well in promoting engagement, which is not surprising, because usually people prefer to go directly to the source of the tweet.

5.3.3.4 Twitter. Topic of tweet

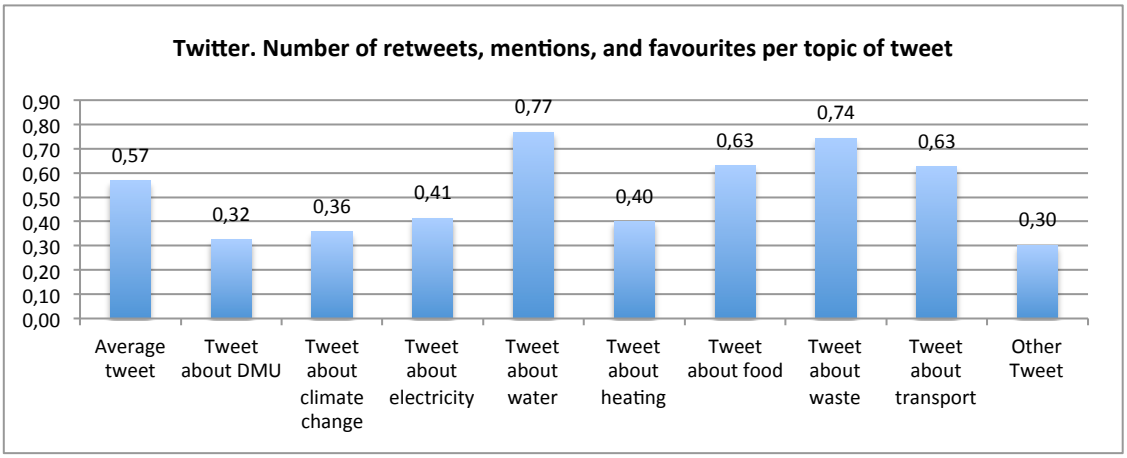


Chart 18. Number of Retweets, Mentions, and Favourites of SustainableDMU tweet by topic.

Chart 18 shows how the best performing tweets have been the ones related to water, waste, and transport, making Twitter slightly different from Facebook, where the most popular topic was DMU. On Twitter, DMU is almost the least popular topic that encouraged interaction and it also is under the average.

However, the results are understandable when we consider the campaign timeline; water, waste and transport correspond respectively to the eighth, seventh and sixth week of campaign. As already mentioned following discussion of Chart 10 and Chart 11, the last three weeks of campaign have been the ones that encouraged the most interaction from followers.

5.3.3.5 Discussion

From the above analysis it emerges that Facebook is a better platform for engagement than Twitter. The average post gets 2.38 actions compared to the 0.57 action of the average tweet. However, when we look at the overall actions Facebook fostered 305 comments, likes, and shares during the eight weeks of campaign; whereas Twitter promoted 458 retweets, mentions or favourites.

Although it is true that actions per post are lower on Twitter, the engagement created is overall higher; which was one of the aims of the campaign. The reasons behind the difference are that although Twitter is a tool where engagement and

interaction are higher, the intrinsic nature of the tool and the volume of traffic make it necessary to increase the number of tweets from SustainableDMU thus reducing the ratio actions/tweets.

Regarding the type of post/tweet, it is not possible to draw clear conclusions between the two platforms, because the interaction is very different. However, it is true that posts and tweets that include a picture, performed better than other posts/tweets. On the other hand, plain text works really well on Twitter, but not as well on Facebook. This might connect back to the characteristic of the two platforms; Twitter is more a discursive place whilst Facebook is increasingly centred around visual and interactive content (and this content will arise from interviews, see 7.3.2.

Concerning the topic, there are no parallels between the two platforms. On Facebook the most 'successful' topics have been DMU, electricity and food. For Twitter it was water, waste and transport.

5.3.4 Conversations. Quantitative analysis

To understand the creation of conversations in more depth, it is possible to have a look at the conversations created on the two platforms. Conversations are defined as an exchange of messages or tweets between SustainableDMU and other users in a number that is higher than two.

Table 23 presents the conversation created by SustainableDMU on Twitter and Facebook before, during and after the campaign. It can be seen that in both cases not only the absolute number of conversation increased, but they became longer, with more messages/tweets per conversation, and they engaged more users. This suggests that the campaign had the positive outcome of engaging more people in a higher number and longer conversations around the issue of sustainability both on Twitter and Facebook. However, Twitter has been more successful in creating conversations. As stated earlier, the ratio Engaged Users/Followers was lower on Twitter than the ratio Engaged Users/Page Fans on Facebook suggesting Facebook was a more powerful tool in engaging its Fans. This might be true, however, Twitter followers

were more active talking with SustainableDMU and one to each other. Therefore it seems that if the aim is to create conversation and not only to spread content Twitter is a more powerful tool than Facebook.

			Number of conversations	Number of people interacting (excluding SustainableDMU)	Number of messages/tweets per conversation
Before Campaign	06/08/12	Facebook	0	0	0
		Twitter	1	1	3
	13/08/12	**Facebook**	1	11	3
		Twitter	0	0	0
	20/08/12	**Facebook**	1	2	3
		Twitter	1	1	2
	27/08/12	Facebook	0	0	0
		Twitter	0	0	0
	03/09/12	Facebook	0	0	0
		Twitter	1	1	2
	10/09/12	Facebook	1	1	3
		Twitter	3	3	2,67
	17/09/12	Facebook	1	1	1
		Twitter	4	4	2
	24/09/12	**Facebook**	3	4	3
		Twitter	1	1	2
During Campaign	01/10/12	Facebook	1	2	11
		Twitter	**8**	**9**	**3,75**
	08/10/12	Facebook	1	1	5
		Twitter	**5**	**5**	**3,20**
	15/10/12	Facebook	2	4	2,5
		Twitter	**14**	**18**	**4,93**
	22/10/12	Facebook	4	13	8,75
		Twitter	**9**	**9**	**3,67**
	29/10/12	Facebook	3	4	3,66
		Twitter	**16**	**17**	**3,63**
	05/11/12	Facebook	6	16	3,66
		Twitter	**19**	**25**	**4,26**
	12/11/12	**Facebook**	**3**	**5**	**12,62**
		Twitter	9	9	3,67
	19/11/12	Facebook	8	13	3,37
		Twitter	**15**	**19**	**3,8**
After Campaign	26/11/12	Facebook	3	3	1
		Twitter	3	5	8

	03/12/12	Facebook	1	2	2
		Twitter	7	7	3,57
	10/12/12	Facebook	0	0	0
		Twitter	7	7	3
	17/12/12	Facebook	0	0	0
		Twitter	2	3	2,5
	24/12/12	**Facebook**	1	1	1
		Twitter	0	0	0
	31/12/12	**Facebook**	1	2	2
		Twitter	1	1	2
	07/01/13	Facebook	0	0	0
		Twitter	3	3	3,33
	14/01/13	Facebook	0	0	0
		Twitter	3	3	2

Table 23. Analysis of the conversations created on Twitter and Facebook by SustainableDMU. Number of conversations, number of people interacting, and number of messages/tweets per conversation per week. In bold the platform which was drawing most interaction during the concerning week. Data downloaded from Twitter and Facebook in September 2013.

5.4 Summary of the chapter

The aim of this chapter was to explore quantitative approaches to social media evaluation in order to shed light on terms like 'influence,' 'impact' and 'reach.' Is it simply how many friends, followers, re-tweets or likes a social media account get or is something deeper going on? It was concerned with some of the tools and approaches available. A methodology was suggested based on four categories: (1) Growth of community, (2) Engagement, (3) Content Indicators, and (4) Conversations. In relation to the first category, growth of community, as for traditional public engagement, to understand the success of the process it is not enough to measure how many people participated, but it is necessary to make sure that the participants are representative of the affected public (and this will be analysed in Section 6.2.2). Similarly, the 'impact' of the process cannot be a simple measure of number of likes or retweets (second category), because it is unclear what is the meaning that people attach to those actions and as such if they constitute themselves an act of environmental citizenship or public engagement.

This quantitative review and analysis of the social media campaign has shown social media can be effective tools in engaging people in conversations, not least, around

the issue of sustainability. Advocates of social media promise much, yet there are significant challenges in encouraging social media users to participate and contribute to the online conversation on social media.

Nevertheless, whilst this methodology has provided evidence of the dialogue between SustainableDMU and its community, it reveals little of the effect of this dialogue on the participants. Consequently a more in-depth analysis of the characteristic of the community and a content analysis of on-line conversations was performed, together with in-depth interviews with participants. This is the focus of the next two chapters.

6 Social media: online participation or a "pointless babble"?

This chapter follows on from the previous that established a quantitative approach to analysing social media data and it addresses the third objectives of the thesis: to analyse a social media participatory campaign and its effectiveness in facilitating public engagement using fairness and competence criteria. In Chapter 3 parallels were seen between public engagement theory that celebrates the power of discourse as a possible route to social learning and environmental citizenship, and social media.

In addition, this chapter follows on from the previous chapter by exploring some of the questions raised

- Who are the people who started following SustainableDMU?
- Were they already interested in sustainability (in other words, were they already engaged environmental citizens) or were they new to the topics?
- What motivated them to follow and interact with the account?

This answers broader questions regarding the reach of social media, that through a purely quantitative approach could not be answered (as it is shown in Chapter 5); namely are social media able to broaden the participation audience, or do they simply increase the number of already engaged participants? Are conversations on social media pointless or meaningful? Can social media generate behaviour change?

This chapter is structured as follows. In Section 6.1 the notions of fairness and competence are presented and developed as a conceptual framework in order for it to be applied to on-line engagement. Following this, in Section 6.2 and 6.3 this conceptual framework is applied to the data retrieved using a mixed methods approach: the quantitative data and the conversations downloaded from Twitter and Facebook, and the interviews.

6.1 The criteria

According to Webler (Webler 1995; Webler et al. 2001; Webler & Tuler 2000) a participatory process needs to be *fair* and *competent*. Fairness refers to the possibility

of all affected parties to legitimately participate in the process. Competence is the ability of the procedure to reach the best outcome possible given what is knowable under present conditions. The criteria are here introduced as they form the methodological structure to evaluate the social media campaign.

Fairness is evaluated through different measures: all the interested parties must have the opportunity to (1) attend the meetings, (2) initiate discourses and (3) participate in the discussions. However, these principles require a subtle evolution to be able to be applied to online processes. Table 24 outlines this approach.

Webler fairness principles	Online fairness principles translation
Attend the meetings	Access to Internet and social media
Anyone who considers himself potentially affected by the outcome of the process have an equal opportunity to attend and participate in discussion	Anyone at DMU who considers himself potentially affected by the campaign on SustainableDMU must have an equal opportunity to participate in online discussion
Initiate discourses	Initiate conversation threads
Participate in the discussion	Participate in the discussion

Table 24. Translation of 'traditional' fairness criteria into the online discussion

Competence is evaluated through the achievement of other measures: (1) all participants must be granted access to relevant information, (2) constructive interactions are to be promoted, (3) constructive behaviours need to be facilitated, and (4) the best available procedures for selecting knowledge must be used. These were translated into online discussion measures as well, as described in Table 25.

Webler procedural competence principles	Online procedural competence principles translation
Promotion of constructive interactions	Were interactions between SustainableDMU and users or among them happening on Twitter or Facebook?
Facilitation of constructive personal behaviour	Facilitation of constructive personal behaviour
Use of the best available procedures for selecting knowledge	Use of the best available procedures for selecting knowledge

Table 25. Translation of 'traditional' competence criteria into the online discussion

In addition, public participation is based on the discussion and dialogue among participants; therefore discourses need to be competent as well. Grounding on Habermas's Theory of Communicative Action (Habermas 1984; Habermas 1987), Webler (1995) defines four rules for the evaluation of competence of the discourses happening during the participatory process. An 'ideal' speech is considered competent when: (1) participants meet minimal standards for cognitive and lingual competence, (2) participants have access to the knowledge needed to make validity claims and criticise others, (3) speakers must verify the results of expressive claims and (4) conclusions about opposing claims are made using the most reliable techniques available. The criteria (presented in Table 26) are relevant.

Traditional discursive competence criteria	**Online discursive competence criteria**
Discourse must meet minimal standards for cognitive and lingual competence	Tweets and comments must meet minimal standards for cognitive and lingual competence
Participant must have access to the knowledge needed to make validity claims and criticise others in order to be able to participate effectively	Were fans/followers providing relevant information (being it at least under the form of a link) when disagreeing?
Speakers must verify the results of any attempt to translate expressive claims	Were expressive claims made?
Judgements about conflicting validity claims must be made using the most reliable methodological techniques available	Were conflicting claims made by fans/followers? How were they treated by others?

Table 26. Translation of 'traditional' discursive competence criteria into the online discussion

The aim here then is to understand if conversations, happening on Twitter and Facebook, have the same depth of conversations happening offline during a participatory process. Some researchers in fact argue that online technology are not designed for in-depth and elaborate critical discussion, the type that is able to promote changes (Lewinski & Dima 2012), because the aim they were initially designed was entertainment and personal communication. However, the debate on the impact of new media on our society and our participation is wide open. Whereas some are positive about the impact that social media are having, such as Sustein who supports the thesis that the participatory '*wisdom of the many*' is producing new and

better forms of knowledge (Sustein 2008), others are of the opposite idea; such as Carr who argues that they are undermining our ability to read, think, and remember (Carr 2010); or such as Keen who argues that social media are eroding our values, standards, and creativity (Keen 2008). A study on the deliberative power of the newspaper comment sections (Richardson & Stanyer 2011) shows how far the reality is from the ideal potential of those websites for open, deliberative, and discursive exchange. The study found that despite the greater opportunities for readers to reply to what they were reading only few of them were moved to comment. Moreover, commenting seemed to be the domain of the highly opinionated who left no signal that they were open to the prospect of changing their mind by the reasoning with other participants.

6.2 Fairness

Claims have been made about social media of being democratic and granting everybody access to information. Although many scholars would disagree (Fuchs 2007; Carr 2010), it is a widespread opinion in the media that fairness is embedded in Twitter and Facebook, as such it is important to understand how many and what people had the chance to truly participate with SustainableDMU.

6.2.1 Access to Internet and social media

A recent survey of Internet use in the UK reported that the 78% of UK adults (over 16) accessed the internet daily, and 74% of them accessed it through a mobile phone (Office for National Statistics 2015). In the age group 16-24 the access to Internet 'on the go' is true for 96% of them. The same survey reported that 61% of UK adults using the Internet were also using social media. Among them, however, considerable differences were found depending on the age group.

A survey was conducted in April 2012 to understand social media use at DMU. Results (presented in Chart 19) show that 82% of respondents owned a Facebook account, whereas only the 47% had a Twitter profile. Of those there are certain differences related to the age group. Chart 19 shows that, although Facebook is more popular

than Twitter across all the age groups, all respondents in the age of 18-24 have a Facebook account, whereas Twitter is not very popular in that group.

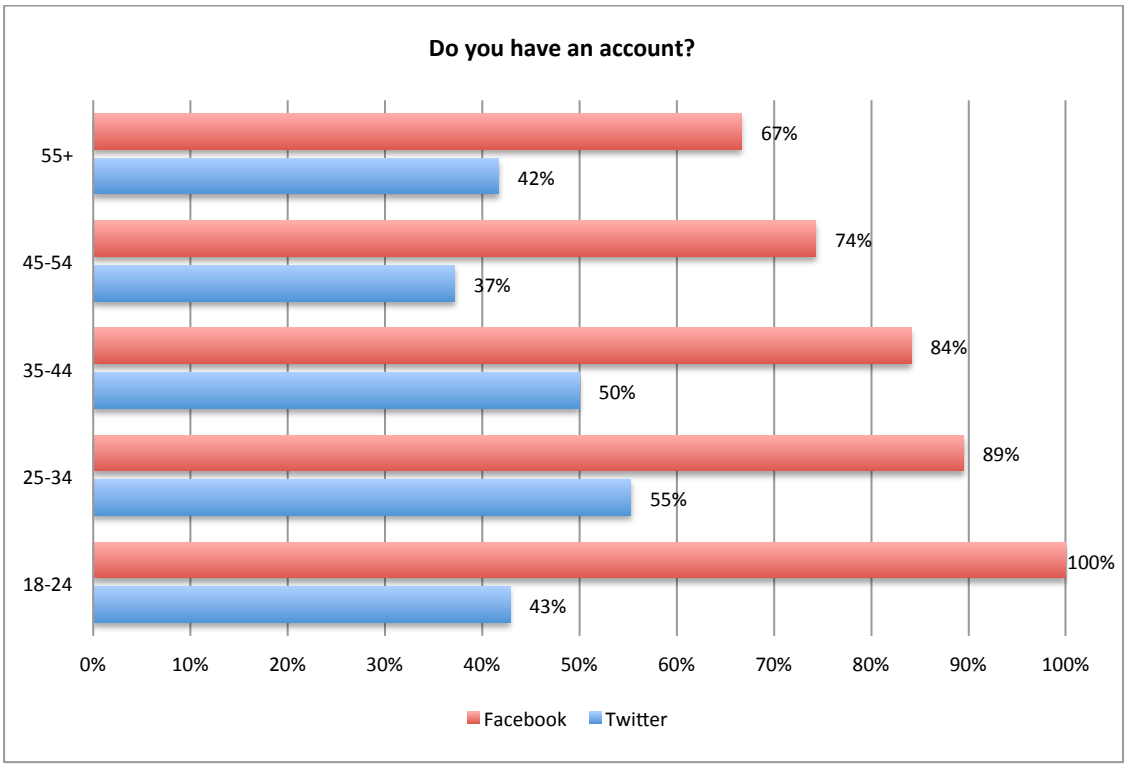


Chart 19. People who own an account on Facebook or Twitter by age group. Survey of DMU staff and students February 2012

Twitter is most popular in the two middle groups, 25-34 and 35-44. Comparing DMU results to the previously mentioned survey on the use of social media in the UK it emerges that DMU users are higher user of social media than the average in all age groups. Particularly regarding people over 55, the 67% of them in fact use Facebook and the 42% use Twitter. These results indicated the researcher that a participatory process built on social media would have been able to reach a large majority of people at DMU, although not everyone.

Great efforts were placed by the SustainableDMU team in enlarging the size of the community, which is the number of people involved, through different activities, as this is mentioned as an important factor for the fairness of the process: *"the more people that are involved, the better the process will be"* (Webler, Tuler & Krueger 2001, p. 439).

6.2.2 Who are the people that were affected by the campaign on SustainableDMU

Understanding the fairness of the process means understanding the people who interacted with SustainableDMU during the process. As previously mentioned, different actions were taken by the SustainableDMU team to increase the reach of the account. Those actions were intended to enlarge SustainableDMU community with the aim of ensuring that all the interested and affected parties had equal opportunities to get involved in the participatory campaign. In the present case, the affected parties are defined as people from DMU, staff and students.

The campaign witnessed a 60% increase in social media traffic on both Facebook and Twitter, increasing to 135 Fans on Facebook and 429 Followers on Twitter. Whilst this is a positive impact it raised questions around the identity of the group. Were the already environmentally alert people who were operating in a 'filter bubble' (Pariser 2011)? Facebook is discussed first.

6.2.2.1 Facebook

71 single users engaged in actions (either a like, comment, or share) with SustainableDMU during the campaign. Active followers are represented in Figure 16. Of those only 20 (that is the 28%) were old fans (on the left of the figure), in the sense that they have interacted with SustainableDMU in the 8 weeks previous to the campaign; therefore they are considered already engaged around the issues of sustainability (and are called 'Green fans' and illustrated in green and with a dashed line).

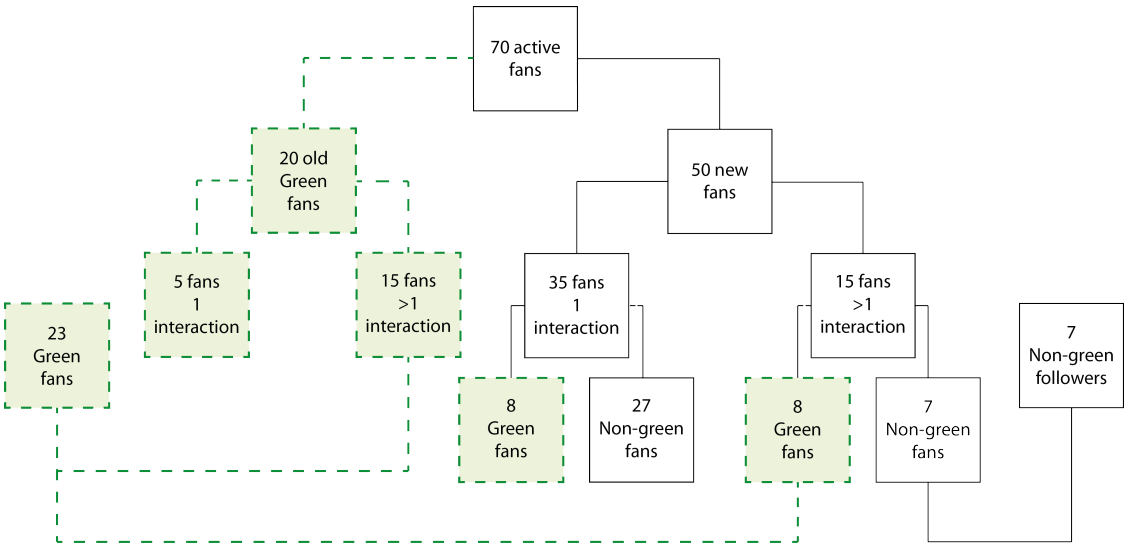


Figure 16. Analysis of SustainableDMU's active fans. Green fans in comparison to non-green ones[19].

The remaining 50 people were new active fans. Of those, 35 engaged in actions only once, whereas 15 interacted multiple times. From a content analysis of the posts on their timeline, of Pages liked, and groups joined the new Fans have been divided into two groups: the Green fans, who were talking about sustainability prior to interacting with SustainableDMU, and the Non-green ones, who have not formerly mentioned environmental issues. However, it needs to be noted that the process of selecting their interest about sustainability was difficult, because Facebook does not allow users to see other users' Timelines unless they are Friends. Therefore for many people it was not possible to see their complete Timeline, but only the things they have decided to make public.

From this analysis it emerges that only a minority of them were talking about sustainability; only 16 people (the 32%). The majority were not talking about sustainable issues on Facebook before engaging with SustainableDMU.

Figure 16 also shows that although 70 single users interacted with SustainableDMU during the campaign, the majority (40 people, 5 in the Old fans group and 35 in the new fans group) only interacted once, denoting not a strong engagement either with the issue of sustainability or the discussed topic.

[19] 'Green fans are here defined as people who mentioned on Facebook sustainability or environment related issues in their posts in the 8 weeks prior to campaign.

Therefore what is interesting is to analyse the engagement of those 30 fans (15 old and 15 new fans; 23 Green and 7 Non-green fans) who engaged in multiple interactions with SustainableDMU to understand if the people that interacted and conversed more with SustainableDMU are only the people that were already interested in sustainability or if other people interacted as well. Figure 17 shows that the Old fans group is composed of 15 fans responsible for 126 actions (that is the 68% of total). Of those only 2.1 fans (14%) were responsible for half of the actions, whereas the other half was hold by 12.9 fans.

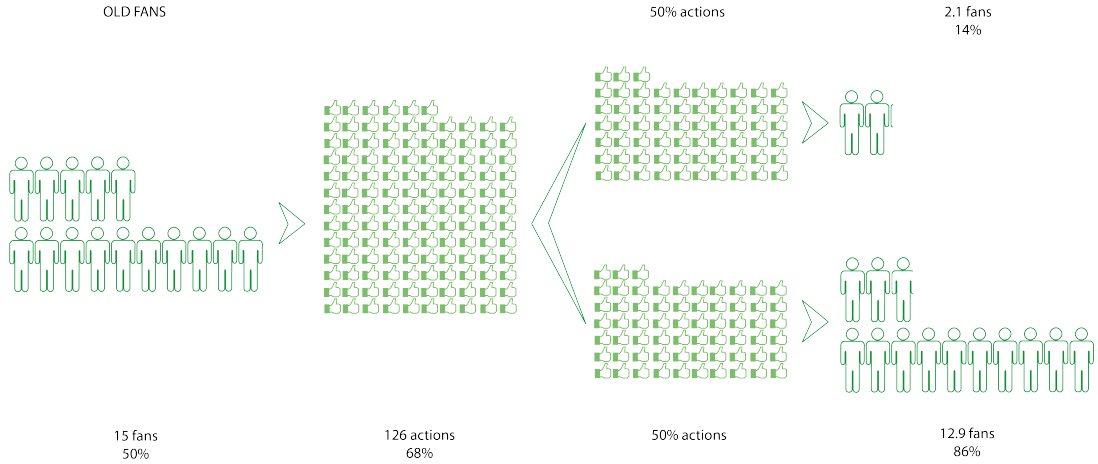


Figure 17. Who was responsible for the interaction with SustainableDMU in the Old fan group.

Figure 18 shows instead the New fans group; the group was again composed of 15 fans but they were responsible for only 60 actions (32% of total). In the group it is possible to isolate again a small percentage of very active fans, in this case only 3 people (that is 20% of total New fans) who were responsible for half of the actions.

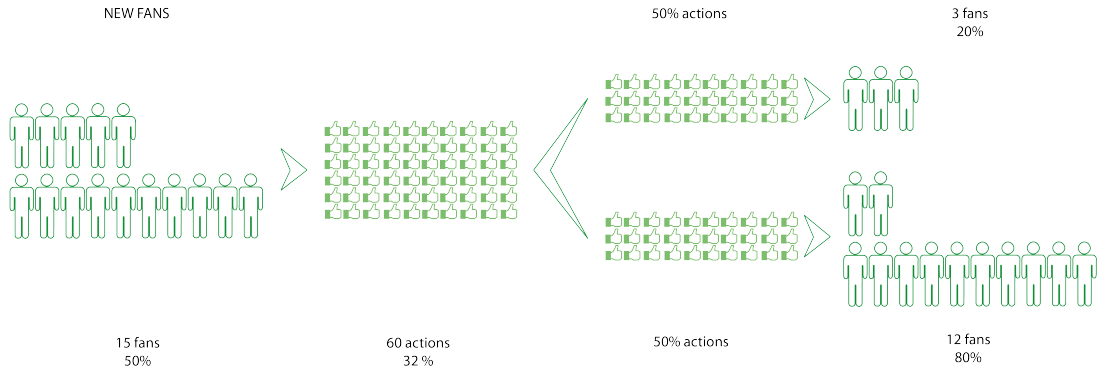


Figure 18. Who was responsible for the interaction with SustainableDMU in the New fans group.

It is evident then that interaction has been higher in the Old fans group. Although the groups were of the same dimension (15 people), Old fans were responsible for 68% of the interaction. Furthermore, in both groups it is possible to define a smaller group of very active participants; it must be noted that in the New fans group two of the three most active fans were Non-green fans.

After having analysed if previous interaction with SustainableDMU impacted participation in conversations, the activity of Green fans is here analysed, as it is shown in Figure 19. This group was responsible for 126 actions (83% of total engagement); however participation was skewed toward the Old fans, who had been performing 83% of actions.

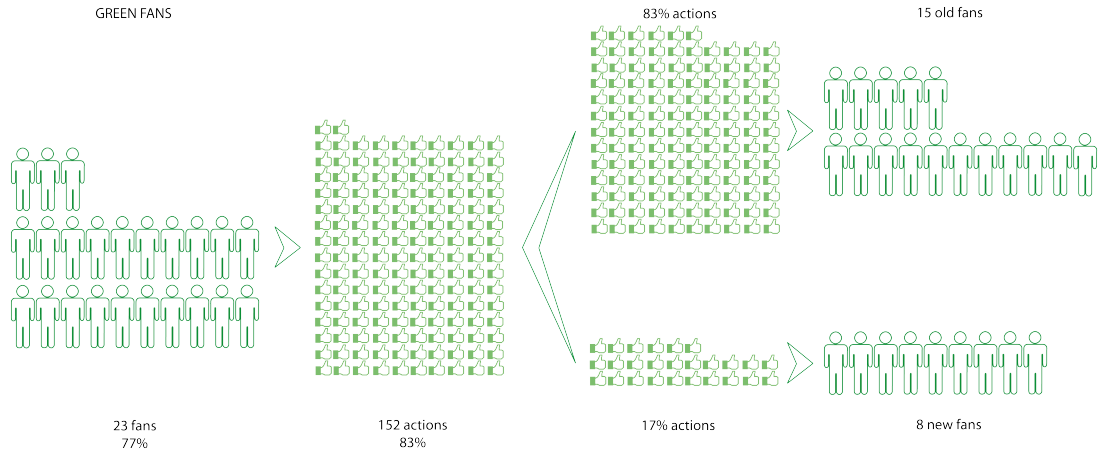


Figure 19. Activity of Green fans (Old and New).

The 7 New and Non-green fans (no picture illustrating this group) instead performed only 34 actions during the intervention period. This group was less engaged with the

interaction suggesting that conversations were distorted toward the views of people already interested in sustainability.

These figures show a significant difference in participation between the two groups; Green fans (77% of active followers) were responsible for 83% of interaction, with an average 6.6 actions per person; whereas Non-green followers were only accountable for 34 actions, that is the 23%, with an average 4.8 actions per fan. However, it also needs to be mentioned that there is a significant difference in participation between old and new fans; in fact old fans were accountable for 8.4 actions per person, whereas new green fans were only accountable for 3.25 actions, even less than the non-green fans.

6.2.2.2 Twitter

By the end of the campaign @SustainableDMU had 429 followers; of those 122 single users (28%) engaged in actions (either a mention, retweet, or favourite) during the campaign. Active followers are shown in Figure 20. Of those only 22 (18%) were Old followers; as such, they are classified as engaged with the issue of sustainability (and referred to as 'Green followers' and shown in green).

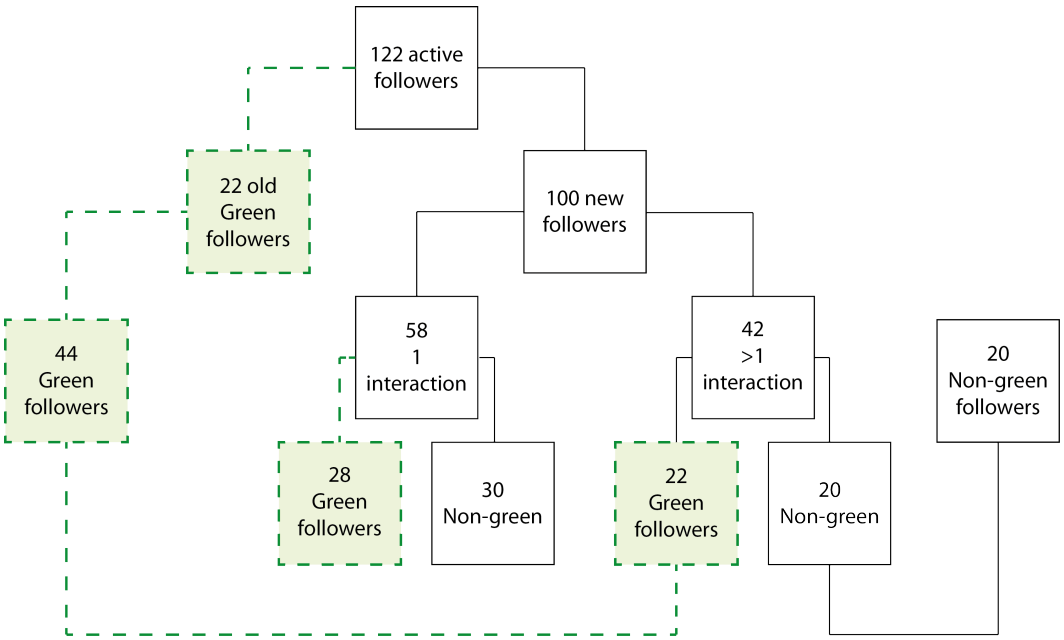


Figure 20. Analysis of SustainableDMU's active followers. Green followers in comparison to Non-green followers[20].

The remaining 100 people are 'New active followers'. Of them, 58 engaged in actions only once, whereas 42 interacted multiple times, and were in the majority accounts of people or groups from DMU (66% of the New followers that interacted more than one time). From a content analysis of the tweets and biography of the new followers, it emerged that over half of them are environmental-centred accounts, or engaged in talking about sustainability on Twitter. As Figure 20 shows, the 59% of active SustainableDMU followers (72 accounts) were already talking about sustainability, while the remaining 41% (50 followers) were new to the topic, at least from what is visible from their online profiles.

Exploring this further requires analysing the engagement of the 64 followers (42 new followers and 22 old ones) who engaged in multiple interactions with SustainableDMU.

Figure 21 and Figure 22 show who were the followers most responsible for interaction in the Old and New groups. The Old followers group, composed of 22 followers were responsible for 128 actions (that is the 36% of total). Of those 4.7

[20] 'Green followers' are here defined as people on Twitter who mentioned sustainability or environment related issues in their tweets in the 8 weeks prior to campaign.

followers (21%) were responsible for half of the actions. Figure 22 illustrates the activity of the New followers group and shows a similar ratio of activity.

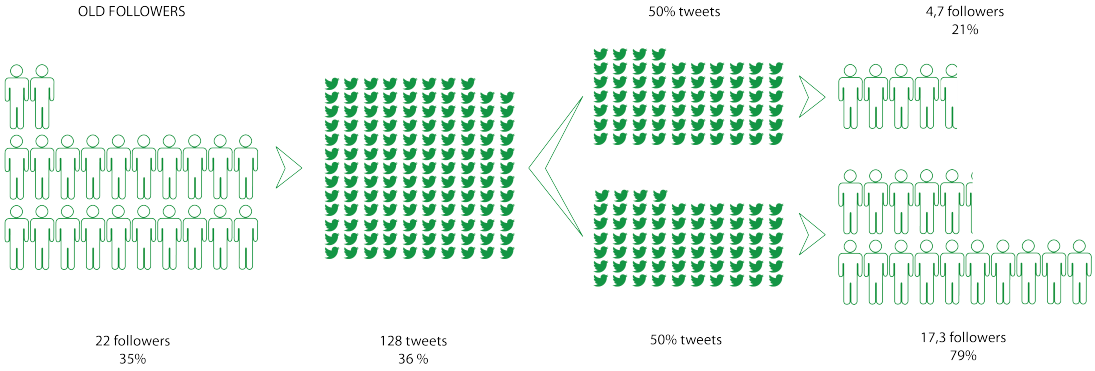


Figure 21. Who was responsible for the interaction with SustainableDMU in the Old followers group.

Figure 22. Who was responsible for the interaction with SustainableDMU in the New followers group.

The interaction has been almost evenly distributed between old and new followers: 35% of active followers (the Old ones) were responsible for the 36% of interaction, whereas 65% of followers (the New ones) were accountable for 64% of total actions. Therefore the old followers have been only slightly more active than the new ones. However, in both groups there is a more active group with around 20% of users responsible for 50% of interactions in both groups.

The Green followers as shown in Figure 23 were by far the largest (70% of active followers) and most active group (80% of tweets). Inside the group there was not a clear division between very active followers and non very active. In both groups however, it is possible to isolate a smaller group of very active participants (who participated more than 10 times) which is of the same dimension in both the Old and New followers group, that is of 4 very active followers.

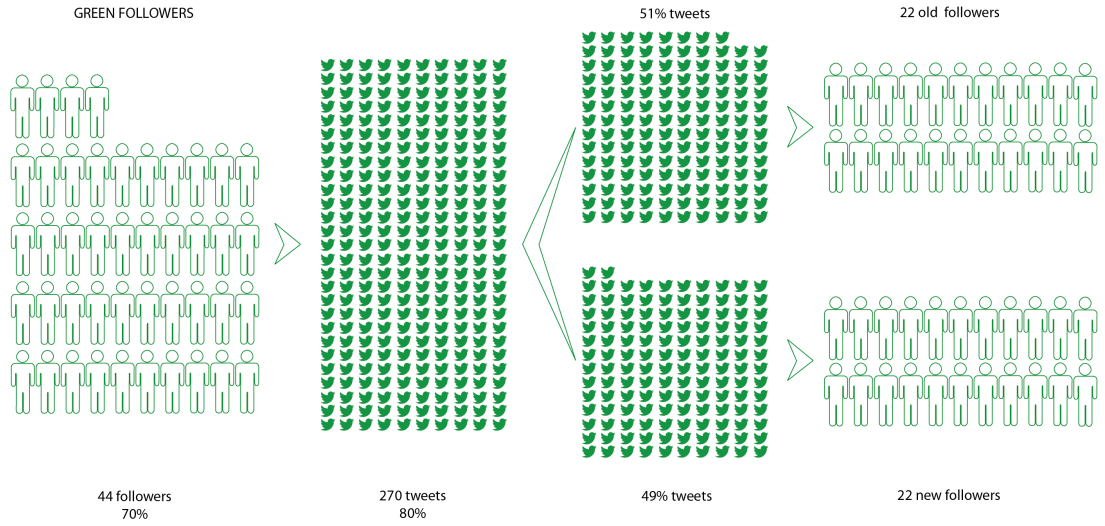


Figure 23. Activity of Green followers

The Non-green followers group (no picture illustrating this group) is a small group who was responsible for only 20% of interaction. This group was not very committed to participate with SustainableDMU.

From this analysis it is possible to see a substantial difference in participation between the two groups; Green followers (70% of active followers) being responsible for 80% of interaction, with an average 6.1 tweets per person; whereas Non-green followers were only accountable for 69 actions, that is 20%, with an average 3.2 tweets per follower.

6.2.2.3 Reflections

Simply judging the success of an environmental communication based on the number of followers, fans, or interactions is inadequate. To that end this analysis has shown that *who* engages is as important as how many. This quantitative analysis of the participants of the environmental campaign shows that interest in the subject

appears to be more important than familiarity with the actual account provider (for example, DMU). Pre-interest on the subject is the motivation for interaction and this corroborates the idea that on social media it is easier to talk to the 'already converted', hence enlarging the audience of people who are already interested in the topic, rather than enlarging the audience *per se* and therefore encouraging interaction from all the different affected parties.

6.2.3 Initiate conversation threads

On Twitter, conversations generally started by a question posed by SustainableDMU, or by replying to a follower's tweet. However, some conversations were spontaneously started by followers, for example the one presented in Figure 24, which shows a conversation started by TW1 regarding lights being left on in Queens Building without any evident purpose. The topic of this conversation is very profound, but this example is here cited only to show the ability to initiate conversation; the actual meaning of it will be treated later.

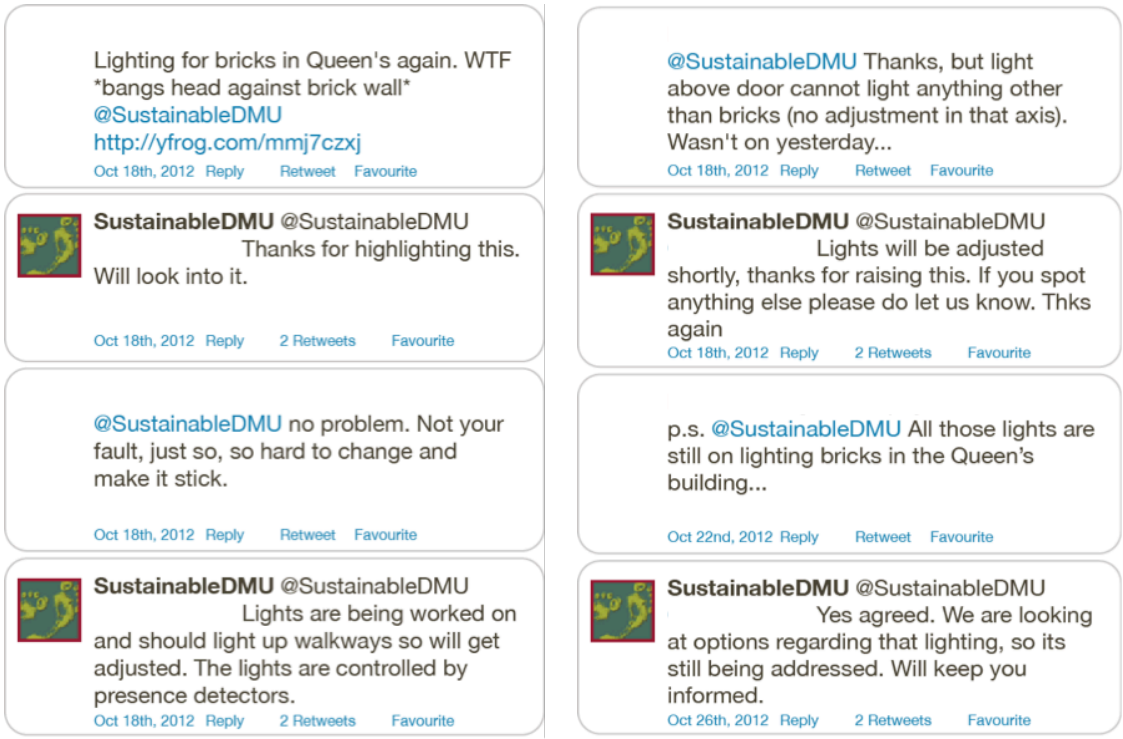


Figure 24. Example of conversation happened during the campaign initiated by a follower. Data downloaded from Twitter in June 2013.

The same can be said regarding Facebook; conversation threads were mainly started by a question posed by SustainableDMU or a post shared on the Page. However, fewer people than on Twitter spontaneously initiated conversations on the page. It was possible to find only two examples of a Fan posting to the Page (one of them is presented in Figure 25)

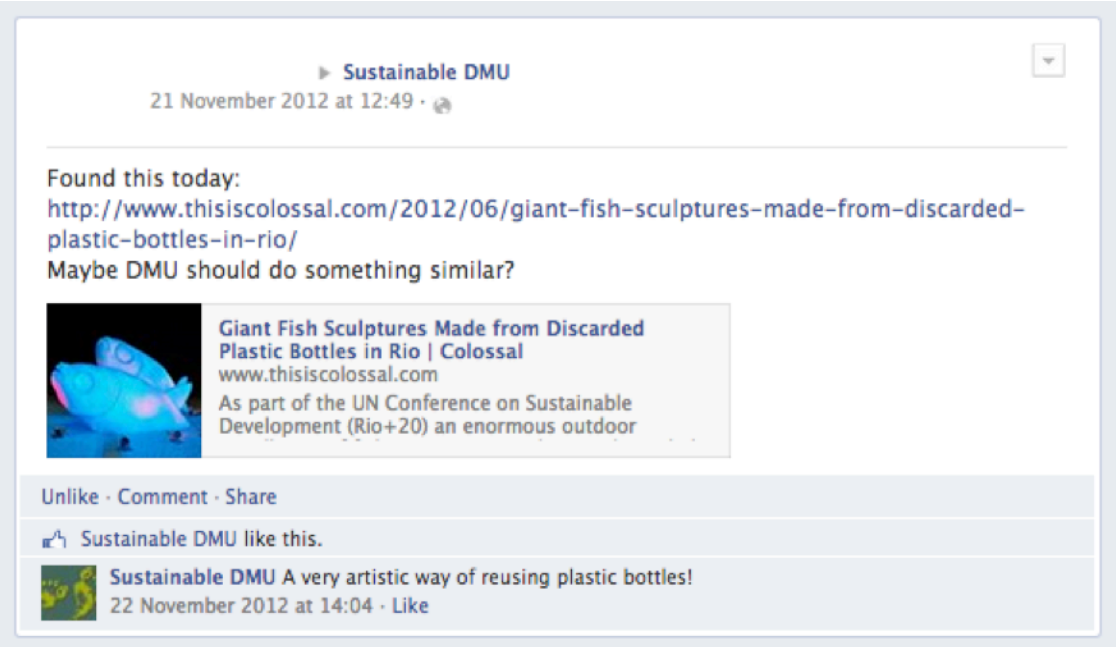


Figure 25. Conversation thread started by a Fan on SustainableDMU Facebook Page.

In parallel with Twitter, numerous posts (eight in total) were created by Fans after the 8th of November following the #DMUbikeTag offline activity of leaving tags on bikes at DMU[21] (an example is reported in Figure 26).

[21] Read the blog post about the activity at http://thelivinglabiesd.wordpress.com/2012/11/09/dmubiketag-a-little-thank-you-for-our-cyclists/

Figure 26. Conversation thread started by a Fan on SustainableDMU Facebook Page following the #DMUbikeTag activity

Although these posts were not spontaneously started by Fans, but followed an action by SustainableDMU, they demonstrate the possibility and easiness of initiating threads on Facebook.

In conclusion it is possible to say that people were given the possibility to easily initiate conversation threads both on Twitter and Facebook. However, few participants took the possibility of starting new conversations; they generally preferred to interact around the topics suggested by SustainableDMU. The fact that interaction happens online and not face-to-face can have two sides: on one hand, it can facilitate the beginning of new conversations since people are less intimidated because more anonymous; on the other hand however, they do not feel the social pressure of other participants or facilitators during the meeting that might stimulate them to verbalise their concerns or opinions. Moreover, a 'constraint' can come to the depth of participants' commitment; not having accepted to join a meeting and sit with other people in a room for a certain amount of time might mean that only the people very engaged with the topic will choose to participate in the discussion and start their own threads, as it is suggested by the fact that the majority of active participants were already interested in sustainability prior to the campaign.

6.2.4 Participate in the discussion

During the intervention, not participation in discussion was highly encouraged with questions posted multiple times a day by SustainableDMU and by promoting discussion between users. SustainableDMU furthermore replied to all the conversations started by its fans or followers both on Twitter and Facebook, manifesting interest in their views and opinions and encouraging discussion, which is one of the role of facilitators in public participation processes (Webler & Tuler 2000).

This role of SustainableDMU as facilitator was positively recognised by participants, as mentioned by one interviewee:

> "*I liked the fact that SustainableDMU was a presence that you can retweet and engage in conversations. Some campaigners don't engage back if you reference them or get back to them in conversations; so I thought that was a good thing."* [P19]

As reported by P19, the fact that SustainableDMU was replying to tweets/comments was a positive factor for him in following the campaign and engaging in conversation. Another participant, P24, also mentioned in the interview the fact that SustainableDMU "*more than anything it generated some discussions*" [P24] during the campaign.

Although everybody was free to participate and regularly encouraged to, only a small percentage did: on Twitter 122 single users (28%) engaged in actions (either a mention, retweet, or favourite) with SustainableDMU during the campaign. On Facebook the number of people interacting was higher: 65 people (48%) engaged in actions (either a comment, like, or share) with SustainableDMU. On average therefore, 1 every 3 fans/followers participated in the discussion with SustainableDMU. However, this is an issue of traditional processes as well. Depending on the group composition, the internal dynamics and the individual characteristics of participants can considerably affect the outcome of the discussion. It can in fact happen that a small group of very outspoken individuals can formulate more than half of the observations during the discussion as reported by Merkle (1996). It also often happens that people who subscribe to participate in the meeting subsequently

never show up. In parallel, people followed SustainableDMU on Twitter or liked it on Facebook, but never participate in the discussion (and possibly never read a tweet or post by SustainableDMU).

6.2.4.1 Participation in the discussion on Twitter

On Twitter there were 122 active followers, over a general audience of 429 people, which means that the 28% of followers were exchanging tweets or retweeting SustainableDMU's messages. A first distinction can be made between those followers who interacted only once (and in most cases with a retweet, which is considered a low form of engagement) and those who interacted more than once.

The division is illustrated in Figure 27; more than half (the 53%) of the followers interacted multiple times, showing a deep intention to participate in the discussion.

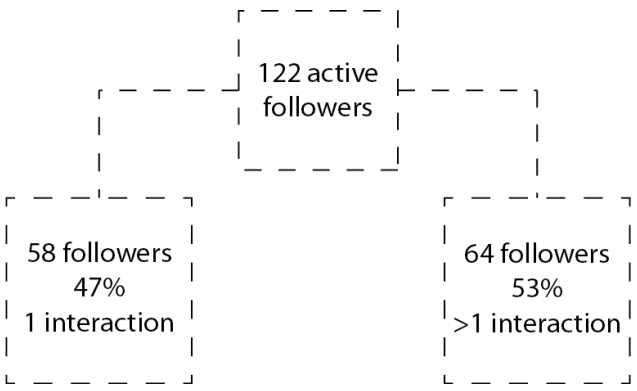


Figure 27. Active followers on Twitter. How many followers interacted once and how many interacted multiple times.

However, as previously said, traditionally it often happens that there are a few very active participants who are responsible for the majority of comments. Figure 28 illustrates how many people were responsible for the majority of actions.

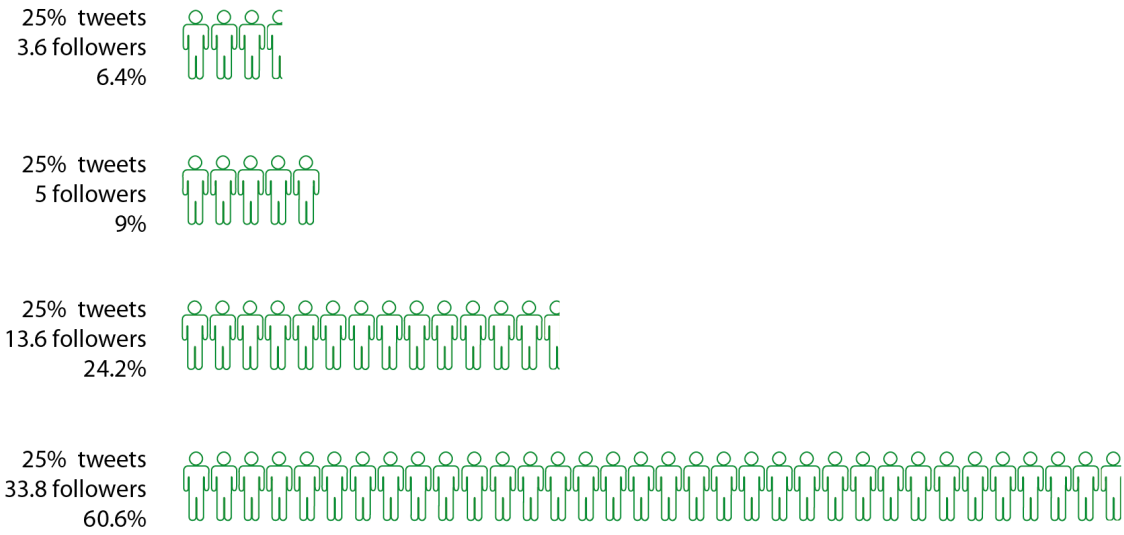


Figure 28. Active followers on Twitter. How many people are responsible for the majority of tweets.

It is evident that there are few very active participants who are responsible for the majority of them; in fact 8.6 followers were responsible for the 50% of tweets, whereas 47.4 followers did the remaining 50%. From this it follows that there are few voices that are heard more often than others and therefore discussion might be biased towards their views. The qualitative characteristics of these very active followers will be investigated in Section 6.3, which analyses the competence of the process.

6.2.4.2 Participation in the discussion on Facebook

On Facebook there were 70 active fans, over a general audience of 135 people, meaning that the 52% of fans engaged in activities on the page, a percentage considerably higher than on Twitter. In parallel with Twitter, it is possible to make a first distinction between those followers who interacted only once (and in most cases with a like, which is considered a low form of engagement) and those who interacted more than once.

The division is illustrated in Figure 29; more than half (58%) of the fans interacted only one time, showing a low intention to participate in the discussion. A lower number, 42% instead was active multiple times on the Page showing a constant interest in the Page activity. The percentages are in this case opposite to Twitter.

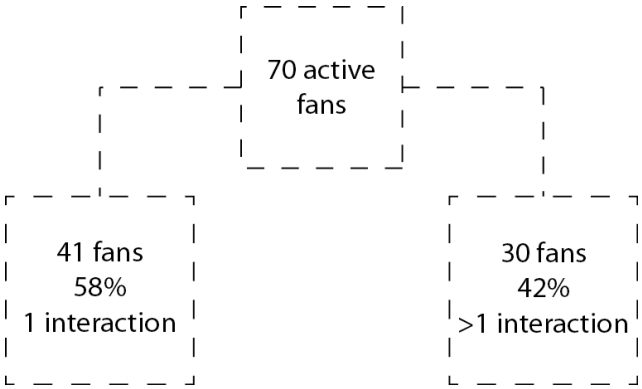


Figure 29. Active fans on Facebook. How many fans interacted once and how many interacted multiple times.

It is possible to investigate for a second time the distribution of actions between the active people, to see how many of them were responsible for the majority of actions; results are illustrated in Figure 30.

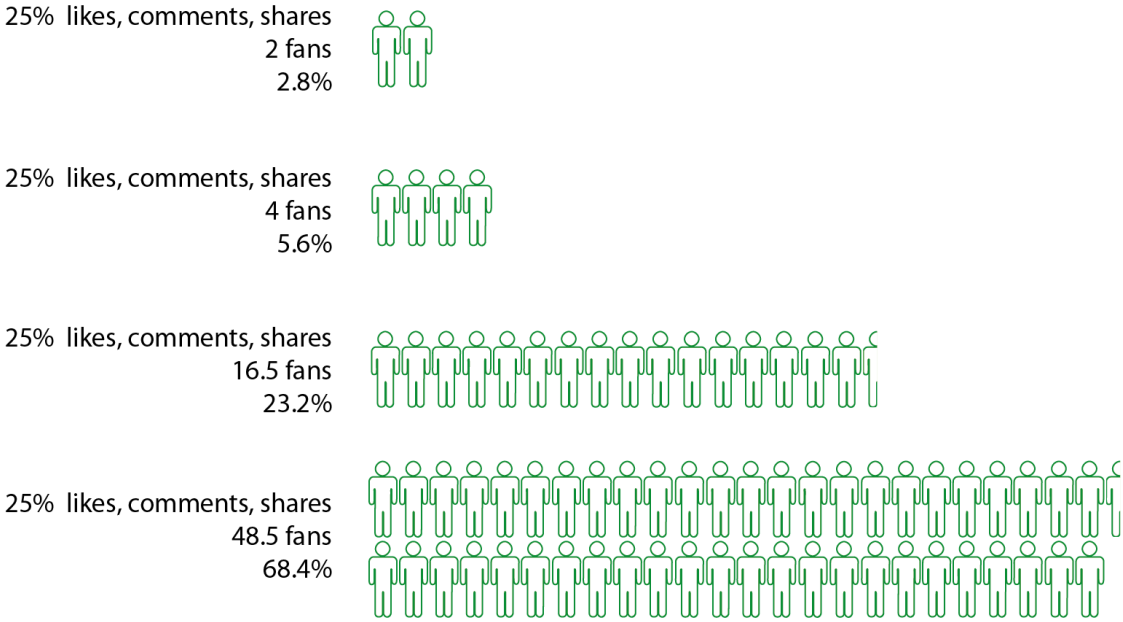


Figure 30. Active fans on Facebook. How many people are responsible for the majority of actions.

From the figure it is evident that there are few very active participants who are responsible for the majority of likes, comments, and shares. On Facebook the disparity is even more accentuated than on Twitter. In fact only 6 fans were responsible for the 50% of actions, whereas 65 people took responsibility for the other 50%.

This is something very important to stress, because facilitators who might want to use Facebook for a public engagement process need to be aware of the difficulties of engaging people on the social network, despite the widespread belief that 'everyone' is using Facebook and is checking it many times a day. Although this is true, not everyone then decides to participate in the conversation. Therefore the risk of obtaining a judgement which is strongly biased by the views of the fans with a stronger voice is real.

The qualitative characteristics of these very active fans will be investigated in Section 6.3, which analyses the competence of the process.

6.3 Competence

As Webler and Tuler (2000, p. 571) state *"competence refers to the construction of the best possible understanding and agreement given what is reasonably knowable to the participants at the time the discourse takes place".* Competence has to do with factors such as: (1) access to information and its interpretation, (2) promotion of constructive interactions, (3) facilitation of constructive personal behaviour, and (4) use of the best available procedures for selecting knowledge (Webler & Tuler 2000; Webler et al. 2001). Therefore competence deals with the depth and breadth of the discourses taking place during the process. Discourses are defined as shared and structured ways of speaking, thinking, interpreting and representing the world (Webler et al. 2001).

To analyse the results regarding the competence criteria conversations will be compared to the principles to draw insights.

6.3.1 Access to information and its interpretation. Were fans/followers provided with relevant information?

As presented in Chapter 4 (Methodology), the campaign was managed mainly by one person: the researcher writing this thesis. The information disseminated via Twitter and Facebook was generally prepared by myself individually, informed by past environmental campaigns and by on purpose literature review, as thorough as

possible given the time constraint. The sustainability and transport officers at DMU fed information about activities at DMU, as they had more knowledge regarding those issues.

In certain cases however, it was necessary to consult with some 'experts' in order to give an answer to questions posed by some participants, as suggested by the theory. An example is reported in Figure 31. In the presented conversation, TW2, a highly involved participant, asked a technical and specific question, which the researcher did not have knowledge about; as such, the question was reformulated to experts from the university.

Figure 31. Example of conversation where experts were consulted to answer a question from a follower.

This conversation is not an example where fans and followers were sharing their knowledge with others, but it is informative to show how access to expert knowledge was provided when necessary, that is when the community on social media could not answer the questions itself. In these cases, questions were posed to experts within the DMU community.

6.3.2 Promotion of constructive interactions

6.3.2.1 Twitter

Generally, interaction happened between SustainableDMU and followers or the other way around. There were few cases were followers interacted among themselves through the facilitation of SustainableDMU. In most of the cases when followers 'talked' one to the other they already knew each other (an example is reported in Figure 32).

Figure 32. Example of conversation where different followers interacted one with each other. TW3 and TW4 are Twitter friends.

Sometimes it also happened that questions or comments made by SustainableDMU in reply to followers remained unanswered.

6.3.2.2 Facebook

In parallel with what happened on Twitter, on Facebook the majority of interactions happened between SustainableDMU and fans, even when more than one fan was

interacting on the same post. In the few cases where fans interacted among them, they previously knew each other, as presented in Figure 33.

Figure 33. Example of conversation where different fans interacted one with each other. FB2 and FB1 are Facebook and offline friends

The figure reports a short conversation started by a question posed by SustainableDMU. The two fans were interacting with each other and it is evident that they knew each other; they are the two other managers of the SustainableDMU Facebook and Twitter page who were participating in the discussion with their personal account; this is an activity they have been doing to stimulate participation by others.

6.3.2.3 Discussion

Interaction on social media is quite different from interaction in a traditional public engagement meeting; first, people are not together and cannot see each other face-to-face; second, interaction might or might not be happening simultaneously; third, interaction is mediated by writing, which make it more difficult to express feelings and eliminate the non-linguistic component of verbal interaction (for example, the tone of people's voices, their hand gestures, etc.) which is difficult to replicate in the

written form. Emoticons and icons try to cover this issue, but the presented participant group has only seldom used them.

The interviewees repeatedly mentioned this issue. To cite one example:

> *"I think Twitter is harder because Twitter is reduced to 140 characters. Things like sarcasm with any written media is hard to get those sort of emotions across; you are joking, you are being sarcastic… so I think people don't always understand what is being written on Twitter". [P18]*

As mentioned in the quote, an additional constraint is posed by the 140 characters restriction of Twitter, although mostly considered a positive trait of the tool by its users. These factors make the facilitation of discussion on social media very challenging.

6.3.3 Tweets and comments must meet minimal standards for cognitive and lingual competence

6.3.3.1 Twitter

Generally, tweets exchanged by participants met the minimal standards, being articulated sentences although expressed in a very short form, due to the 140 characters constraint. This is not that usual however; with a quick search with the hashtag #dmu on Twitter it is possible to see that many tweets are not articulated or do not compose a complete sentence. This did not happen with interaction regarding @SustainableDMU.

Only a few times sentences were divided into more than one tweet in order to better explain opinions; what people like about Twitter is the fact that on Twitter information is in a short format so that it is easy to assimilate, as mentioned by one interviewee:

> *"At first it uses to frustrate me to use only 140 characters, but that kind of burst of information… that people can just look at*

> *and they don't have to read through all the stuff to get the message, they've got the message there". [P14]*

On the other hand P27 does not like that it is difficult for her to add her opinions when retweeting something because there is no space for doing it, and she mentions this as a factor that would make her more or less happy in retweeting things.

> *"I get annoyed by the fact that you tweet something really interesting, I try retweet with my comment and I go over the 140 characters and I just think "I can't be bothered". So that hooks me seriously as one of the reasons why I don't go further with retweet". [P27]*

Therefore, the shortness of the tweets could be a constraint in using Twitter for deliberative purpose, people are not able to fully explain their views, given the shortness of space for expression.

6.3.3.2 Facebook

Facebook does not share the problem of shortness of characters with Twitter; however, it is easy to find on Facebook comments that do not meet the minimal standard. Again, this is something that did not happen in occasion of SustainableDMU campaign; fans were very careful to use appropriate language, although the eventual 'OMG'. In Section 7.4.1, the reasons reported by participants for being respectful during the campaign will be presented.

6.3.4 Conflicting validity claims

To start it needs to be said that not many conflicting claims were made by participants during the campaign. Although people were asked for their opinion not many followers decided to express them. Therefore conversations were very respectful and most of the time expressed concurring opinions, with few exceptions. This is not considered a very positive outcome given the public participation grounding theory, which asserts that learning is achieved when people with different interests and opinions come together and learn to take on the perspectives of others

(Webler et al. 1995). Therefore if no contrasting opinions are expressed it is supposedly difficult to develop a long term and beyond the process learning. The learning process will be analysed in the following chapter, here the few exceptions, where contrasting claims were made, will be discussed.

6.3.4.1 Twitter

Figure 34 shows a conversation started by a tweet by TW5. It was *food week* and the opening tweet reported a link to a research about the antioxidant content of organic tomatoes compared to non-organic ones. TW5 replied by questioning the health benefits of a higher content of antioxidant in food, citing an NHS research. @SustainableDMU responded to this with his views about organic farming and the impact beyond individual health of such an approach. However, the conversation did not take the form of a real discussion as TW5 did not explained fully his views and opinions in his succeeding reply.

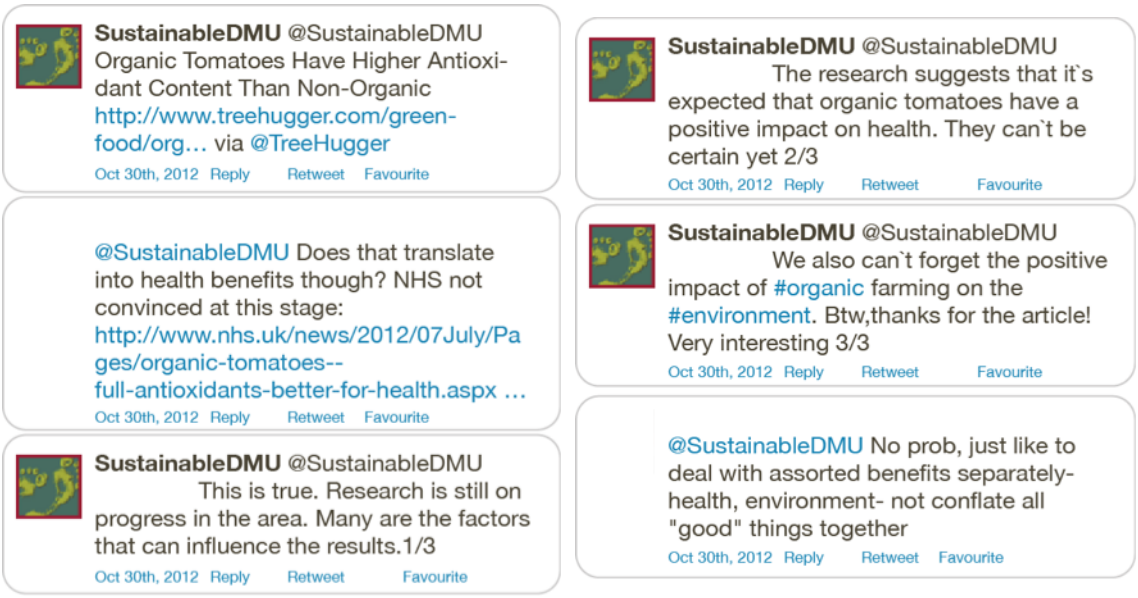


Figure 34. Example of conversation started by a follower making a conflicting claim.

Another interesting conversation happened around the issue of the Fairtrade system and is presented in Figure 35. The conversation happened the week immediately following the end of the campaign. However, it is analysed here, as it is a consequence of the campaign as well.

TW6
Fair Trade is pretty much exploitation - the growers don't make any more money through Fair Trade than other routes. But hey, it's ethical!
Nov 28th, 2012 Reply Retweet Favourite

TW9
to be honest people have been saying this for years. But I'm still gonna go with fair trade over definitely not fair trade every time.
Nov 28th, 2012 Reply Retweet Favourite

TW2
evidence?
Nov 28th, 2012 Reply Retweet Favourite

TW6
I will never buy Fair Trade products because of this - they set a floor price. Coffee growers can get more elsewhere...
Nov 29th, 2012 Reply Retweet Favourite

TW6
Here: ssireview.org/articles/entry... here: link.springer.com/article/10.100... - read similar a few years ago.
Nov 29th, 2012 Reply Retweet Favourite

TW6
...but suspiciously, Fair Trade still ends up being more expensive than other brands. Equal Exchange is a much better model!
Nov 29th, 2012 Reply Retweet Favourite

SustainableDMU @SustainableDMU
FT products not more expensive. Bought some FT strawberry jam las week which was much cheaper than other brands
Nov 29th, 2012 Reply Retweet Favourite

TW6
Equal Exchange is a better model than Fair Trade . which is essentially a marketing organisation that profits licensing
Nov 29th, 2012 Reply Retweet Favourite

TW9
Wait, are we talking brands here or concepts? Because all the equal exchange stuff I see is also marked with Fairtrade logo
Nov 29th, 2012 Reply Retweet Favourite

TW6
@SustainableDMU
Focus was more on coffee rather than other commodities.
Nov 29th, 2012 Reply Retweet Favourite

TW6
It's really just the Fair Trade brand rather than the model of fair trade
Nov 29th, 2012 Reply Retweet Favourite

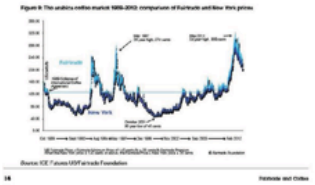
SustainableDMU @SustainableDMU
Even so, you can find cheaper FT coffee than unFT coffee. Price will change with quality of product. Same for all.
Nov 29th, 2012 Reply Retweet Favourite

SustainableDMU @SustainableDMU
Fairtrade guarantees min price for commodities. If global/market price rises above min, this price is paid
Nov 29th, 2012 Reply Retweet Favourite

TW8
@SustainableDMU
also might want to look at direct trade coffee which can be more ethical as direct relationship
Nov 29th, 2012 Reply Retweet Favourite

SustainableDMU @SustainableDMU
Producer co-ops get social premium which can be invested in education and health progress.
Nov 29th, 2012 Reply Retweet Favourite

SustainableDMU @SustainableDMU
Fairtrade price is a min price which always covers cost of production & tracks global price



Nov 29th, 2012 Reply Retweet Favourite

SustainableDMU @SustainableDMU
Note huge differential between FT price and global price in early 90s and 00s
Nov 29th, 2012 Reply Retweet Favourite

TW7
@SustainableDMU
You might want to read @gregvalerio blog on his work on #fairtrade gold http://blog.gregvalerio.com/fairtrade...
Nov 29th, 2012 Reply Retweet Favourite

SustainableDMU @SustainableDMU
FT do lots in supporting producers as well as raising awareness of global trade issues see their annual reports
Nov 29th, 2012 Reply Retweet Favourite

SustainableDMU @SustainableDMU
Not saying it's the perfect system to solve global poverty but it's an excellent start to build on
Nov 29th, 2012 Reply Retweet Favourite

Figure 35. The 'Fairtrade conversation'. A conversation about the Fairtrade system where conflicting claims were made.

Figure 35 presents a conversation started by TW6, one of @SustainableDMU followers. Because Fairtrade was mentioned, @SustainableDMU decided to reply to the very critical view of the follower about the issue. The first aspect to be noted of this conversation is that it is a very articulated one; many people replied and different conversations were sustained contemporarily. However, the two main participants are TW6 and @SustainableDMU, who in this instance present itself as the 'expert' about the Fairtrade system and participate in the discussion with a manifest educational purpose: to explain TW6 and other followers why Fairtrade is a good and ethical system.

At the end TW6 says that it was something he did not know and that this will make him reflect about the ethical implications. It seems therefore that TW6 is open to listen to others' views and that the discussion had some impact on him. This is a clear example of Twitter not being a 'pointless bubble', but being a medium for learning and debating.

Interestingly, both TW6 and TW2 were interviewed therefore it is possible to have insights about this matter from what they said during the interviews. When asked if he ever changed an opinion following something read on social media TW6 replied he did and also added that:

> *"I've come to a clearer understanding of why people do certain things because of what I've read on social media, on people's blogs and links". [P19]*

Therefore it is possible that this conversation, which cited articles and papers, did make him think about the Fairtrade system with a different eye.

Tw2 also commented on the conversation and reported a different view:

> *"What annoys me is someone quoting a blog as evidence; blogs are people's opinions. If you want to claim something is exploitation then give me scientific peer reviewed literature to back that up. And I'll accept that. […] And I think in a university situation we should be more careful, we should be more rigorous on what we are stating as fact on social media". [P18]*

It is manifest here that the intention of TW2 to participate in the conversation was not only to discuss the ethics of the Fairtrade system, but specifically to comment on the trustworthiness of the cited sources and on the use of social media for validity claims in an institutional context.

6.3.4.2 Facebook

On Facebook interaction was similar to Twitter concerning conflicting claims; few were made and the majority of the people added their comments in line with the opinions presented by SustainableDMU. However, during the sustainable food week a protracted conversation occurred between SustainableDMU and three other followers, which is presented in Figure 36.

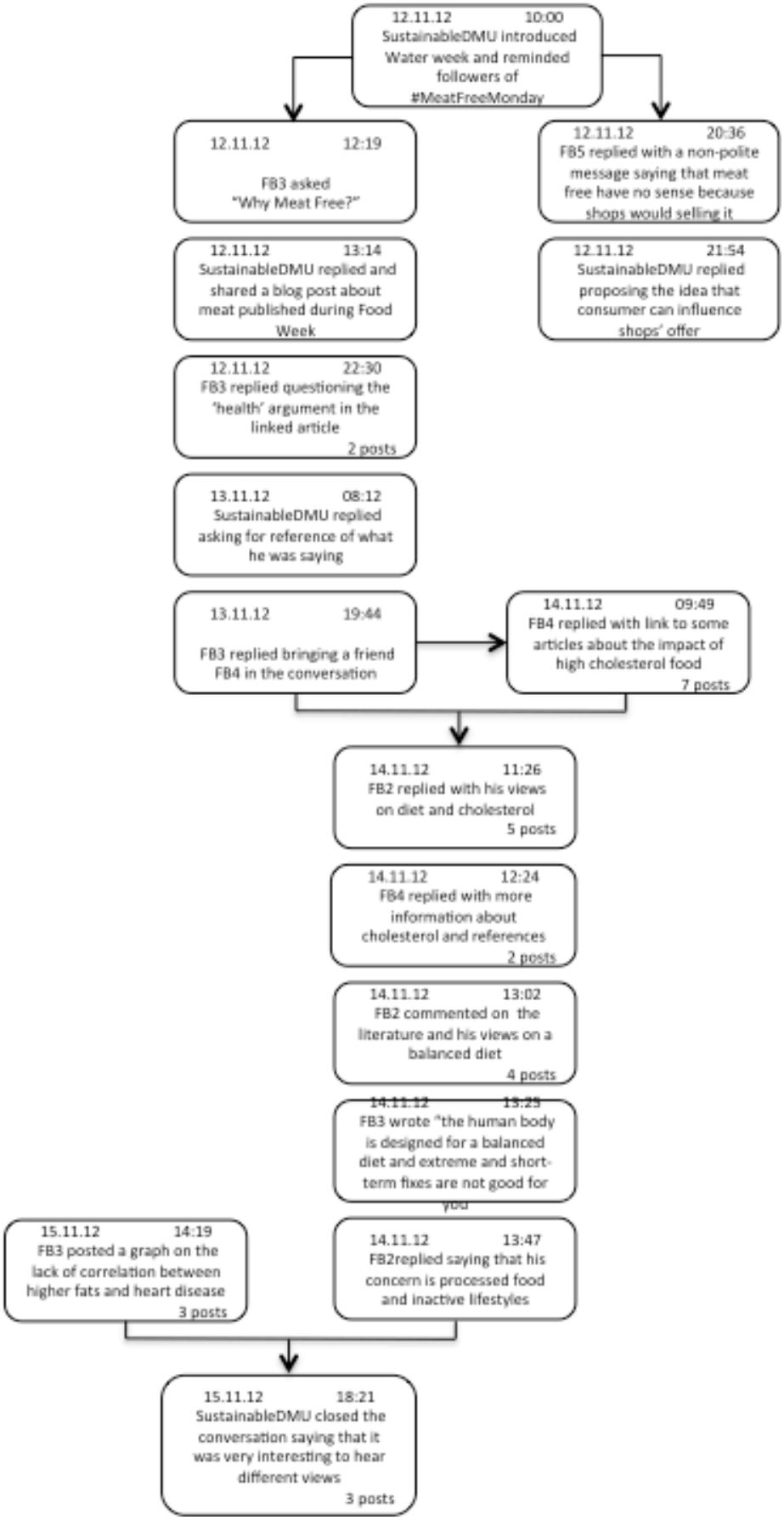


Figure 36. Conversation started on the 11th of November 2012 on Facebook.

First, although the post wanted to introduce the theme of the new week it started a conversation regarding an accessory topic, Meat Free Monday[22]. Second, very positively, the first fan asked why meat free and when prompted to an article demonstrated to have read it, which is a demonstration of high commitment and then added his own view. Moreover, once asked to provide the relevant information related to what he was affirming he brought into the discussion a friend to talk and discuss about reference-based knowledge. Third, the two fans did engage forth and back in the discussion, with the intention of having a thorough conversation about the issue, a characteristic that can lead to learning.

One of the participants mentioned the conversation during his interview and stated that he learnt something new and that the information presented could have been true, but he was not very convinced by the evidence presented. Therefore it is clear he took into consideration the conflicting claims made by the other participants; hence, although he was the expert in this case, he learnt something new from other people.

Fourth, it generated quite strong reactions from fans, especially from the second one to reply, showing that it was quite a significant issue for him to discuss.

Finally, and less positively, the conversation did not discuss about environmentally related issues, showing that there are issues more relevant to people at DMU than the environment.

6.3.4.3 Discussion

As it will be shown from the analysis of the interviews, one of the reasons that not so many opposing opinions were expressed on Twitter and Facebook is the result of the conversations being publicly visible: SustainableDMU is an expression of De Montfort University, therefore expressing something overly critical regarding the university might have serious consequences. This is not due to the fact that DMU does not accept critics, but that those critics are visible to potentially 'everyone' and therefore

[22] Meatless Monday is an international campaign that encourages people to not eat meat on Mondays to improve their health and the health of the planet.

can threaten DMU public reputation. Therefore, conversations online are a delicate matter for an institution.

Interviewees repeatedly mentioned this issue. Two examples are cited here:

> *"Some students used Twitter to complain to the VC, for example to say that the printers are not working. My boss said that I need to tell the students that if they want to complain they need to do it through the official way, because a random stranger looking at Twitter and seeing all the students complaining is a bad thing for the university". [P10]*

These comments demonstrate that social media can have a strong impact on the institution when people choose to use their deliberative power and ask for a change.

> *"It's difficult because you have to make some decisions about how boundaried you are and I am not. So… I tweet all the time but my Twitter feed, my biography don't mention DMU […] I don't mention DMU because of DMU social media policy. Because the things that I write about are quite political and contentious, so I need to try to maintain some distance". [P11]*

Although these comments show that it can be difficult to freely express opinions on social media in the context of an institution, as people will be able to tell who is making the criticism and therefore disapproval is not anonymous, they also shows that social media are a powerful tool when one wants to exercise his power of asking for a change.

In line with (Dahlberg 2001a) this shows that a deliberative structure for addressing conflicting validity claims on social media exists. However, the quality of these exchanges needs to be determined.

6.3.5 Access to knowledge

This criteria refers principally to the facilitators team, as defined by Webler (Webler & Tuler 2000). However, in the present case it is interesting to see if participants would

provide information related to the claims they are making, given the fact that it is easy to do so in the contest of social media, being able to attach a link to any message.

6.3.5.1 Twitter

In regards to Twitter, Figure 34 presents an example were TW5 provided a link to a NHS article to ground his conflicting statements with the view expressed by @SustainableDMU.

An insightful case in which followers supported their statements with more information is the case in which they used Twitter as a tool to communicate with the DMU energy management team. This happened in a couple of occasions (as presented in Figure 37, Figure 38 and Figure 39). The use of social media as a tool to communicate with the energy and maintenance team have been evaluated by Lehrer et al. (2012), who found a considerable potential in this approach to improve communication between building managers and building occupants.

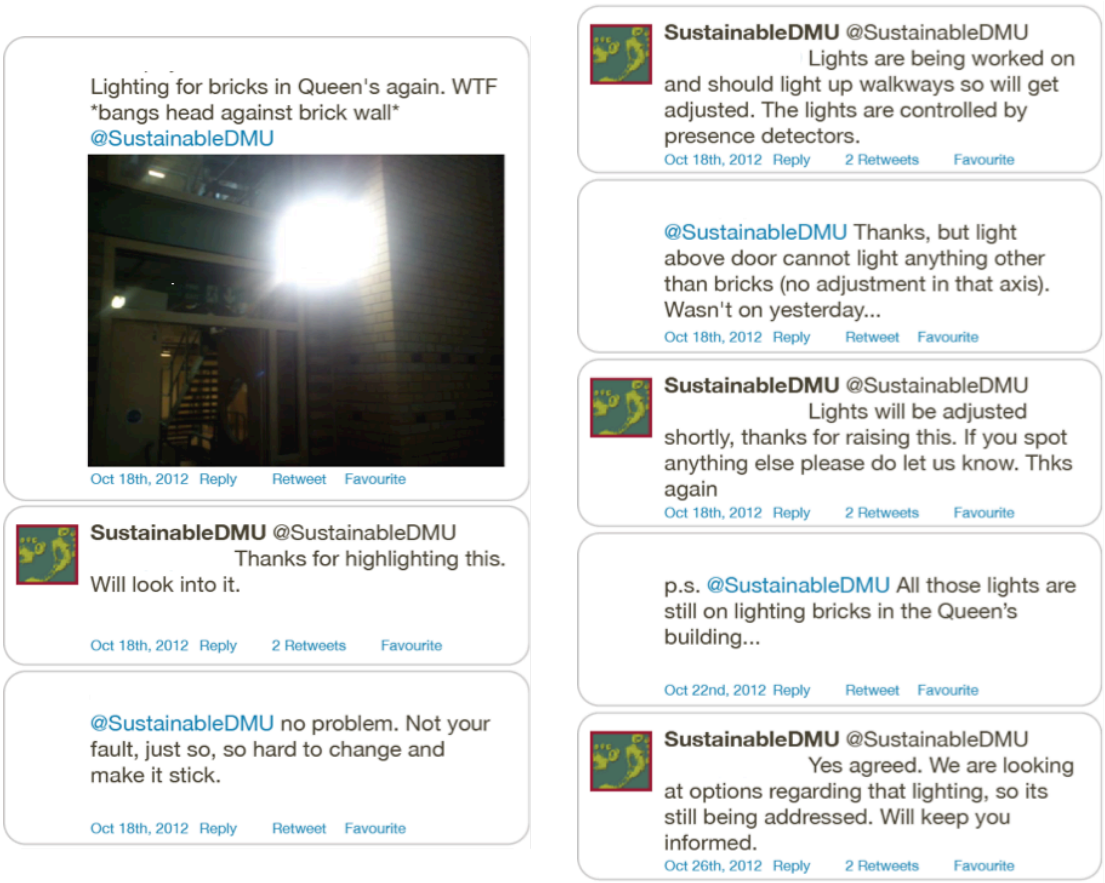


Figure 37. Conversation started by TW1 where he supported his statement by providing a picture. Data downloaded from Twitter in June 2013

Figure 37 (as well as Figure 38) presents a conversation started by a follower around the issue of lights being left on without an evident purpose in one of DMU's buildings. The communication was encouraged and positively accepted by SustainableDMU staff, as it was one of the aims of the SustainableDMU account itself. The reported conversations are an example of how Twitter is facilitating the communication with the Sustainability Officer at DMU (who is a co-administrator of the SustainableDMU account). As can be seen in Figure 39, the issue related to the recycling bin is not an issue directly managed by the Sustainability Office, however the team was able to raise the issue to the relevant team at DMU.

Figure 38. Conversation started by TW9 where he supported his statement by providing a picture. Data downloaded from Twitter in January 2014.

Figure 39. Conversation started by TW10 where she supported her statement by providing a picture. Data downloaded from Twitter in January 2014.

6.3.5.2 Facebook

On Facebook, people did not report references (or links) of what they were stating, except one occasion, the already cited conversation about Meat Free Monday (Figure 36). In this instance, however, the two fans reported links to articles they read because repeatedly asked by SustainableDMU.

6.3.5.3 Discussion

The access to knowledge factor is a fundamental aspect, not only in the evaluation of a participatory process, but especially for the positive outcome of the process itself. Without access to the relevant knowledge participants in fact are not able to make any decision. Therefore it is key not only that the relevant knowledge is provided and chosen with the best available techniques, but also that participants are given the time necessary to read, evaluate and absorb the knowledge (Petts 2001).

However, this could be very difficult in the social media environment; people are in fact 'bombarded' all the time with new pieces of information and knowledge and it is difficult not only to gain the attentions of fans and followers, but especially to let them be able to make value judgement about the provided information. Because of the large amount of knowledge available, it is nearly impossible for anyone on Twitter and Facebook to read each article that is presented and subsequently to judge it.

This issue was repeatedly reported by interviewees, an example is a quote by P13:

> *"If I follow an hundred people some of them are on Twitter constantly. And there's news organisation that I follow as well. And… it just goes too fast. If I scroll down for thirty second, by the time I get back to the top there are ten new tweets. […] I'd love to sit there all day, […] and look at all the links that people post up. That would be interesting, but I just haven't got the time to do that". [P13]*

P18, one of the managers of SustainableDMU account, mentioned the issue and highlighted the difficulty of being heard in the network:

> *"I don't know quite how people do that. I would sit and look at SustainableDMU Twitter stream maybe if I have got time in my day […] But that's half an hour of my day. I don't know how students do it. I guess if we hit them because they are looking at it then we are lucky or there are people out there who are following us because they are actually genuinely interested in what we say". [P18]*

Therefore, it is apparent that an issue exist about the depth of penetration of the information provided through Twitter and Facebook, and especially through Twitter, because of the large quantity of competing information and the rapidity of flow of such knowledge. Whereas during traditional participatory process people are provided with books or reports previous to the meetings or during those in preparation for the next ones, here people are asked to comment immediately on research, links, and so on.

Therefore, questions arise as to whether they can elaborate a new and original opinion based on the provided evidence, or if they will present opinions formed during previous experience. This is an issue of learning during the process and as such will be discussed in the next chapter.

6.3.6 Speakers must verify the results of any attempt to translate expressive claims.

Habermas defines expressive claims as those speech acts where "*the speaker refers to something in his subjective world, and in such a way that he would like to reveal to the public an experience to which he has privileged access*" (Habermas 1984, p. 326). Expressive claims deal with the truthfulness of participants, the sincerity and authenticity in what they say.

Trust, for face-to-face interaction, is a critical factor for sharing information and fostering new relationships (Lewis & Weigert 1985 in Dwyer, Hilts & Passerini 2007) and it also fundamental for online relations (Dwyer et al. 2007).

As previously mentioned it is difficult to interpret people's statements on social media; they are in written form and there is little possibility of understanding things such as irony or sarcasm. Moreover, most of the time it is not possible to personally know the person behind the screen, therefore it is difficult to understand if he/she is worth the trust. For some participants trust is an issue of knowing offline the person they are speaking with, but sometime trust is created through familiarity and conversations on Twitter and Facebook. As one of the interviewee stated:

> *"I give a bit more value if I know that this is someone I know and I think 'This must be worthwhile reading'. I think people's profile do sort of influence the way you interact on Twitter or value something. I think if you find something useful then you are going to go back to them". [P22]*

Similarly P11 stated that:

> *"There are certain people whose voices I trust. There are certain people who in public I've never met, but also I've read stuff and I know about what they do. There are people that I worked with on projects, or I have written with them. So I know them, I trust them". [P11]*

Therefore trust is a major issue on social media; it is difficult to understand the people to trust, which is why people rely on already created offline relationship or they rely on well-know, established figures (as mentioned by P11).

However, there are people that are happy with the way social media works; an example, the next citation from P32's interview:

> *"Some people have a concern about the way people interact on Facebook and the fact that people are happy to speak their mind through their fingers, rather than their minds. I don't see a problem with it, to be honest. I think that if people are being honest, then fine, I am happy to see it". [P32]*

P32 is younger than P11 and P22 and he is a very high intensity user of social media (although P11 is too); a possibility is that younger people see fewer implications for trust than others because they are more accustomed to the tool or because they were 'born' with it. Research have found a correlation between age and trust or privacy disclosure on social media (Dwyer et al. 2007). Moreover, in a study about financial information posted on social media, trust has been correlated to the familiarity of use of social media, that is people that were active and frequent users of the tools were also more trusting of the information they found there (ING Group 2012).

6.4 Summary of the chapter

The chapter explored SustainableDMU campaign through the lenses of fairness and competence, the first two criteria for the evaluation of the success of a participatory process. It also analysed the differences of the process as implemented through social media. As presented, the criteria are highly effective in evaluating the campaign on social media and offer vast insights.

From the presented results and in line with Dahlberg (2001a), it is evident that social media share one of the main constraints of traditional process: issues with the recruitment of participants, which are related to the fairness of the process. Social media in fact seem to be able to enlarge the overall audience, however they do tend to engage people who share similar interests or who know each other; similarly to what happens through traditional recruitment. Moreover, the internal procedural fairness of the meetings (in the case of social media, virtual meetings) seems to be similar; some voices are more heard than others.
As one of the interviewees [P18] pointed out "*social media are a useful tool but I don't think they solve all of our communication problems. They certainly helped us engage with a younger audience*", which is often a very difficult demographic fragment to engage in public engagement processes (Petts 2006).

Relating to the competence of the process, social media seem to be somewhat superficial; people did not particularly enjoyed 'talking' about the proposed topics,

and often although interacting chose to answer questions in a light-hearted way, which can critically compromise the deliberative power of the process itself and which made questions arise as to whether learning is achieved during the process.
In relation to the matter of the deepness of conversations on Twitter and Facebook, a difference needs to be noted between the two networks; whereas on Twitter the number of conversations was higher (as also highlighted in Chapter 5) and conversations were longer (in the sense that on average they were composed by a higher number of tweets) they appear to be more superficial. As highlighted through this chapter, followers only briefly, and apparently lightly, talked about the different topics introduced, whereas on Facebook it is interesting to see that fans although engaging in fewer occasions were more happy to explain in depth their views and opinions and to discuss the issues. As expressed by (Dahlberg 2001a): *reflexivity is often a very minimal part of cyber-deliberations.*

This is one difference of social media respect traditional processes; the fact that is very difficult to facilitate the virtual meetings and to promote engagement. Participants are not together in a room; they have not committed to participate in a meeting for a couple of hours; they are reached by SustainableDMU's tweets and posts during their daily activity, which might endanger their participation. Although claims are made for social media to be successful because they are a completely free space, this questions the commitment of participants or their motivation to participate.

The following Chapter continues the analysis in an effort to explore whether social media engagement has the same deliberative potential and capacity to contribute to changing society towards a pro-environmental model.

7 Social learning and social media; is there a relationship?

Social learning is predicated to be not only a fundamental outcome of participation, but also a strong component of the process (Webler et al. 1995; Bull et al. 2008; Petts 2006). However, social learning is not an automatic result of participatory processes as specific conditions need to be verified during and after the process to allow participants to achieve it (Tippett *et al.* 2005 in Bull, Petts & Evans 2008). From a social learning perspective, the research analysed if participants achieved any learning of new knowledge and if people reached moral development, in the way of learning to see their interests in the context of the common good. However, the study also aims to evaluate if the process of learning went 'beyond the process' and therefore if learning translated into a change in behaviours and in an enhancement of environmental citizenship.

The chapter explores these issues through discussing the results of the interviews and addresses the fourth objective of the thesis: *To critically assess the potential of social media as a behaviour change tool leading to behaviour-change and environmental citizenship*.

This chapter first defines the criteria through which the interviews have been analysed (Section 7.1); second it presents the interviewees on the ladder of Environmental and Digital Citizenship (Section 7.2); third it presents the analyses of the interviews following the three criteria (Section 7.3: Cognitive enhancement; Section 7.4: Moral development; and Section 7.5: Behaviour change), and finally discusses the results from the interviews (Section 7.6).

7.1 The criteria: cognitive enhancement, moral development, and behaviour change

Social learning is intended to be a process through which participants develop new knowledge and in which they learn to perceive their personal concerns in relation with collective concerns (Webler et al. 1995). Moreover, Webler et al. assert that social learning is the expression of the democratic potentialities of deliberative

processes, considering that "*when citizens become involved in working out a mutually acceptable solution to a project or problem that affects their community, they mature into responsible democratic citizens and reaffirm democracy*" (Webler et al. 1995, p.444). Therefore, social learning signifies more than individuals merely learning in a social situation (Bull et al. 2008). This concept of responsibility connects the theory of public engagement to the concepts of environmental citizenship, which, as discussed in Chapter 3, emphasise duties and responsibility over individual rights, in an attempt to go beyond the liberal notion of citizenship (Dobson 2010; Dobson & Bell 2006). In this new concept of citizenship, which is achieved through a process of learning, responsibility is related to the idea that citizens might want to change their longer-term behaviour in order to alleviate their impact on the environment (Bull et al. 2008; Dobson 2004). The concept of responsibility is for the present research of major importance. The intervention context is a large institution, where users (i.e. staff and students) are not directly asked to be responsible for the use of collective goods and services. This could mean for example to pay for the use of those goods or services. As such, learning to be responsible for their own actions is a major factor for the enhancement of environmental citizenship.

Building on the literature, the data retrieved from the interviews with participants in the campaign will be analysed following Webler et al.'s criteria: 'cognitive enhancement' and 'moral development'. However, the aim of this thesis is to assess whether the process can affect people as environmental citizens. As such, a third criteria is used for the analysis: behaviour change. This to ascertain whether or not through a public engagement process people learn to see beyond their own interests and pursue the collective interests of responsible environmental citizens and as such behave in a pro-environmental way.

7.1.1 Defining the criteria

Researching in the context of social media, it is noteworthy to see first if any learning is achieved through the participation into online activities, and second to understand the depth and breadth of the learning, that is to understand if social media, tools often considered 'shallow' and aimed at light-hearted conversations (Carr 2010), can

bring about behaviour change in the context of environmental citizenship and how large is the impact of the conversations happening online on the offline attitudes and actions of social media users.

'*Cognitive enhancement*' and '*moral development*' are the two main components of the process of social learning (Webler et al. 1995):

1. Cognitive enhancement refers to an increase of knowledge of the involved parties, knowledge that is related not only to technical competence, but also, and more importantly, to collective values and preferences. In the process are included learning about the state of the problem, of possible solutions, and consequences; learning about other people's or groups' interests and values, but also reflections about one's own interests; learning about different communication strategies and tools, and finally the ability to practice holistic thinking regarding the issue.
2. Moral development refers to the process through which participants become more competent to make evaluation about what is right and what is not. This is the moment in which people learn to set aside their egoistic demands and act for the collective ones. This includes being able to respect and adopt the perspective of others, to develop a sense of responsibility and of solidarity with the group; to develop moral reasoning and problem solving skills, that facilitate the resolution of conflicts; to learn how to integrate new knowledge into the choice of the best options; and to learn to cooperate with others to solve collective problems.
3. Behaviour change. The thesis aims to discover if the learning achieved is then translated into practical pro-environmental actions. As discussed in Chapter 3, debate continues as what constitutes an environmental citizen (Burgess, C M Harrison, et al. 1998; Blake 1999; Stern 2000; Owens & Driffill 2008). An early definition of environmental citizens described them as: being environmentally educated, having environmental awareness and concern and showing environmentally responsible behaviour (Hawthorne & Alabaster 1999). Stern (2000) presents environmentally significant behaviours, which are connected

with the use, purchase, and disposal of products, the use and maintenance of goods and services that have an environmental impact (e.g. heating and electricity), the disposal of waste, transport choice, and green consumerism. Hence, the interviews will uncover if participating in the social media campaign made people change behaviours related to the environment and if as a consequence they became environmental citizens or more engaged environmental citizens.

	Off-line intervention	**Social media intervention**
Cognitive enhancement	Learning about the state of the problem, of possible solutions, and consequences	Learning (or increased learning) about climate change and about environmental sustainability at DMU
		Learning (getting new information) in the social media context
	Learning about other people's or groups' interests and values, but also reflections about one's own interests	Learning about other people's interests and values and reflect about own interests in the social media context
	Learning about different communication strategies and tools	Learning about different communication strategies and tools
	The ability to practice holistic thinking regarding the issue	The ability to practice holistic thinking regarding the issue
Moral Development	Being able to respect and adopt the perspective of others	Being able to respect and adopt the perspective of others
	Develop a sense of responsibility and of solidarity with the group	Develop a sense of responsibility and of solidarity with the group
	Learn how to integrate new knowledge into the choice of the best options	Learn how to integrate new knowledge into the choice of the best options
	Learn to cooperate with others to solve collective problems	Learn to cooperate with others to solve collective problems
Behaviour Change	Pro-environmental behaviour change	Impact of the social media campaign on participants'

Table 27. Social learning criteria as applied to a social media intervention

The analysis of the interviews following these criteria reconnects to the questions arisen in Chapter 5: (1) What does engagement on social media mean?; (2) What impact do these tools have on offline lives?; (3) Do actions like a 're-tweet' or a 'like'

constitute an act of citizenship or public engagement?; (4) Why do people do those actions?; (5) What is the expected outcome?

Other research has studied the social learning achieved during public engagement processes (Tippett et al. 2005; Petts 2006; Webler et al. 1995; Talpin & Wojcik 2010) and some also went beyond to search for the enhancement of environmental citizenship of participants (Bull et al. 2008); all of them however examined 'traditional' participatory processes in which participants were brought together at different time for focus group meetings.

The contribution of this research is to explore whether use of social media, as the tool to implement a participatory process, is possible and see what differences exist between traditional participatory processes and online ones.

The evaluation of cognitive enhancement, moral development and behaviour change is achieved through the content analysis of interviews and of the questionnaires performed at the end of the intervention period (i.e. the social media campaign).

7.2 The interviewees on a ladder; environmental and digital citizenship

32 interviews were performed with staff and students from DMU, who were directly or indirectly involved. Key questions related to whether an engagement process on social media has led to an increased understanding of the performance of environmental sustainability in the institution and to a greater appreciation of participants' own responsibility.

Table 28 details the participants' role at DMU, their department and the main social media tools they used to participate in the campaign.

Participant's code	Role at DMU	Department	Main tool used
P1	Staff	Library	Twitter
P2	Staff	Student Union	Twitter/Facebook
P3	Staff	Student Union	Twitter/Facebook

P4	Staff	Square Mile	Twitter
P5	Staff	Technology	Facebook
P6	Student	ITMS	Twitter
P7	Student	Business	Twitter
P8	Staff	Institute of Energy and Sustainable Development	Facebook
P9	Student	Institute of Energy and Sustainable Development	Facebook
P10	Staff	Humanities	Twitter
P11	Staff	Administration	Twitter
P12	Student	Technology	Facebook
P13	Student	Institute of Energy and Sustainable Development	Twitter
P14	Staff	Business	Twitter
P15	Staff	Technology	Facebook
P16	Student	Institute of Energy and Sustainable Development	Facebook
P17	Staff	Estate	Twitter
P18	Staff	Estate	Twitter
P19	Staff	Administration	Twitter
P20	Staff	Student Union	Twitter
P21	Staff	Library	Facebook
P22	Staff	Employment	Twitter
P23	Staff	IT support	Twitter
P24	Student	Business	Twitter
P25	Student	Institute of Energy and Sustainable Development	Twitter
P26	Student	Technology	Facebook

P27	Staff	Institute of Creative Technology	Twitter
P28	Student	Business	Facebook
P29	Student	Institute of Energy and Sustainable Development	Facebook
P30	Staff	Technology	Twitter
P31	Staff	Student Union	Twitter
P32	Staff	Student Union	Twitter/Facebook

Table 28. Participants and their role at DMU

The table shows that participants were mainly staff from a mix of departments and that the majority of people used Twitter over Facebook. However, this is not the whole story about them and more will be told about the participants during the analysis of the interviews.

It was necessary to consider whether different factors were influencing participation; two key factors have been considered (1) people's digital literacy, i.e. digital citizenship (presented in Figure 40), which could influence the way people see the digital tools and therefore the place digital technologies occupy in their lives in terms of impact and influence; (2) people's environmental citizenship (presented in Figure 41), as to ascertain if people who are already aware and active about the issue of environmental sustainability would learn differently than people with lower level of engagement. The answers' provided by participants during the interviews have been used to code participants into these categories.

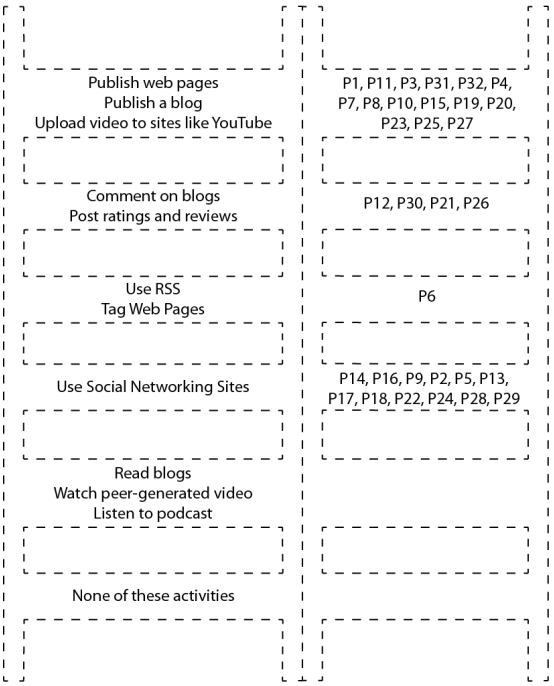


Figure 40. The distribution of interviewees following the ladder of e-participation design by Ferro and Molinari (2010)

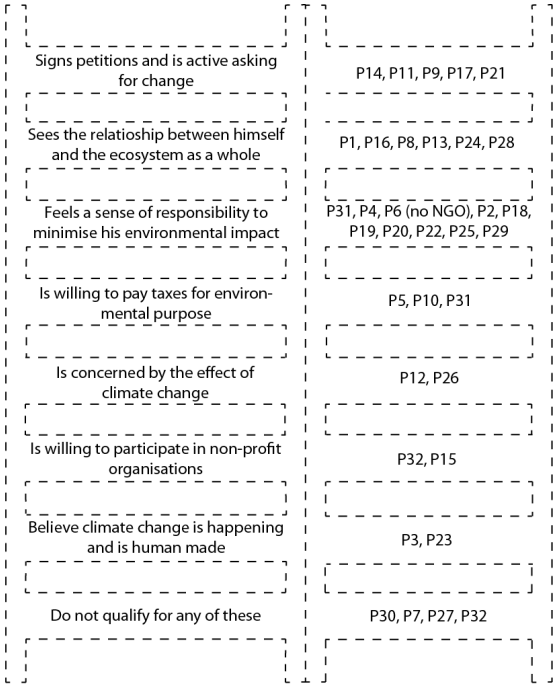


Figure 41. The distribution of interviewees following the ladder of environmental citizenship based on Stern and Dobson(Stern 2000; Dobson 2010)

It is clear from Figure 40 that on average the group of participants shared high level of e-participation; this is not surprising as the base level was the use of social networking sites. People on this rung of the ladder are defined 'joiners' and it is a very low level of engagement as people 'only' participate on the web by having a profile (or multiple ones) on social media. However, the interviewees are in the majority higher consumer of content on the Internet and in many cases they are creators of content as well; many of them in fact fit in the highest rung of the ladder. Figure 41 presents interviewees on the ladder of environmental citizenship as introduced in Chapter 3. Few of them do not classify for any environmental citizenship activities and do not self-identify as environmental citizens. They instead are very active digital citizens; being on the top of the ladder they are the ones that are most likely to be influenced by information posted on social media. As it is evident from Figure 41, most of the interviewees fit in the top three rungs of the ladder, confirming the idea that most of the people interested in interacting with SustainableDMU are like-minded people and therefore are already engaged environmental citizens, or anyway interested in the topic of sustainability. It is easier

to get their attention because they are very likely to be looking for that kind of information on social media; on the other hand, the process will have a stronger impact on them because they are looking for suggestions to change in the proposed direction, although the content of the discussion might not be new to them.

Figure 44 represents the participants on a graph that compares their level of Digital and Environmental citizenship. On the vertical axis the different levels of Digital Citizenship are measured (from 0 to 6), whereas on the horizontal axis are measured the levels of Environmental Citizenship (from 0 to 7).

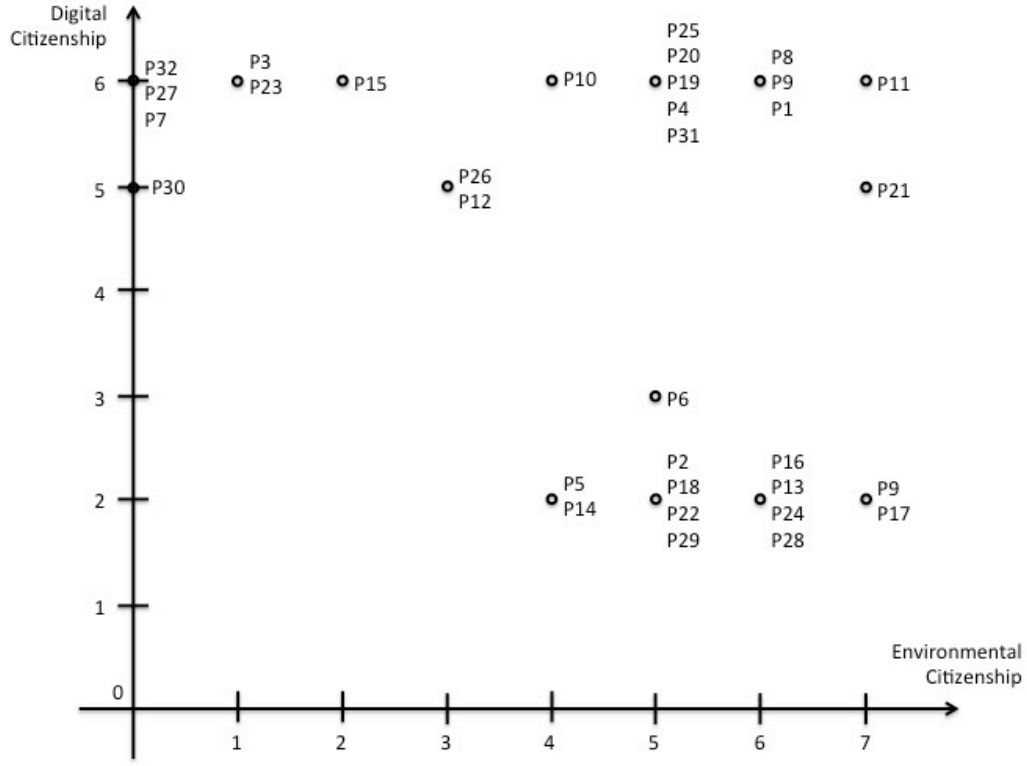


Figure 42. The participants on the Digital/Environmental Citizenship graph

From Figure 42 it is evident that three main groups of participants emerge:

1. Group 1: EC/eProd. Environmental Citizen (EC) and e-Producer. Participants in this group have high level of both Environmental and Digital Citizenship;
2. Group 2: EC/eCons. Environmental Citizen and e-Consumer (eCons). Participants in this group have high level of Environmental Citizenship,

they are not content producers on digital technologies, but mainly consume content;

3. Group 3: nEC/eProd. non-Environmental Citizen (nEC) and e-Producer (eProd). Participants in this group have high level of Digital Citizenship and are very active creating content on social media, but are not Environmental Citizens, as they are not taking actions to reduce their environmental impact.

Group 1 EC/eProd	**Group 2 EC/eCons**	**Group 3 nEC/eProd**	**No group**
P1 Staff EC/eProd	P24 Students EC/eCons	P23 Staff nEC/eProd	P26 Student eProd
P25 Student EC/eProd	P13 Student EC/eCons	P7 Student nEC/eProd	P14 Staff eCons
P3 Staff nEC/eProd	P2 Staff EC7eCons	P15 Staff nEC/eProd	P5 Staff eCons
P4 Staff EC/eProd	P6 Student EC/eCons	P27 Staff nEC/eProd	P10 Staff Staff eProd
P19 Staff EC/eProd	P16 Student EC/eCons	P30 Staff nEC/eProd	P12 Student eProd
P20 Staff EC/eProd	P17 Staff EC/eCons	P32 Staff nEC/eProd	
P21 Staff EC/eProd	P18 Staff EC/eCons		
P8 Staff EC/eProd	P28 Student EC/eCons		
P9 Student EC/eProd	P29 Student EC/eCons		
P31 Staff EC/eProd	P22 Staff EC/eCons		
P11 Staff EC/eProd			

Table 29. Characterisation of participants in the 3 groups: EC/eProd, EC/eCons, and nEC/eProd

The Characterisation of participants in these three groups have guided the following discussion about emerging themes from the interviews.

7.3 Cognitive enhancement

The present section presents the insights gathered from the interviews around the criteria of cognitive enhancement. For the brief structure of the paragraph refer to Table 30, which indicates the codes through which cognitive enhancement has been assessed, the themes emerging from the interviews and the people that were

mentioning those themes during the interviews. Cognitive enhancement refers to an increase of knowledge of the involved parties, knowledge that is related not only to technical competence, but also and more importantly to collective values and preferences.

Codes	**Themes emerging from interviews and people mentioning it**			
Learning (or increased learning) about climate change and about environmental sustainability at DMU Section 7.3.1	Making DMU a better place	Role of SustainableDMU in understanding sustainability	Sustainability at DMU as an institution Sustainability is a PR exercise for DMU Sustainability is important for DMU DMU can and should do more	The majority of people at DMU do not care about sustainability
	P13 P22 P29 P4 P9 P7	P11 P22 P24	P15 P26 P27 P5 P8 P10 P12 P15 P16 P17 P20 P25 P26 P27 P28 P29 P30 P6 P14 P16 P19 P2 P23 p29 P3 P30 P31 P32 P4 P5 P7	P11 P13 P14 P15 P17 P18 P2 P20 P21 P22 P24 P25 P28 P29 P31 P5 P9
Learning (getting new information) in the social media context Section 7.3.2	Use social media as a source of news and knowledge	Information finds you on social media	Without using social media people will miss things	There is too much information
	P2 P7 P9 P11 P15 P20 P21 P22 P25 P28 P29 P31	P2 P12	P11 P27	P2 P13 P14 P20
Learning about other people's interests and values and reflect about own interests in the social media context Section 7.3.3	Gain a better knowledge of other people's interests and opinions	Gain better understanding of what other people are doing	Letting other people see only what one wants / Emerging of personas on social media	Writing down things (on blog or Twitter) help in understanding better own problems and solutions
	P1 P4 P8 P10 P11 P12 P19 P24 P27 P28 P31	P1 P13 P20 P23 P30	P4 P5 P10 P11 P16 P25	P1 P7 P19 P27
Learning about different communicati	Why social media is an effective tool for communication	How to talk on social media	How information spread on social media	Social media are not enough

on strategies and tools Section 7.3.4	P2 P3 P4 P5 P8 P20 P24 P28 P29 P32	P2 P3 P29 P32 P5 P8 P24 P28 P32	P4 P7 P12 P13 P22	P17 P32 P20 P25 P28 P29 P31 P32
Practice holistic thinking Section 7.3.5	P9 P11 P14 P15 P18 P25			

Table 30. Cognitive enhancement: the themes emerging from interviews

7.3.1 Learning (or increased learning) about climate change and about environmental sustainability at DMU

During the interviews there were numerous mentions of what people have been learning about climate change and about sustainability at DMU. Mostly mentions were positive, but sustainability at DMU did not come without its critics.

Firstly, several people felt that DMU is becoming a better place, thanks to different activities, such as the pedestrianisation of the central road of DMU campus. According to P4, this is important for safety reasons more than for environmental ones: "*The fact that they pedestrianized the central area of DMU […] there are environmental benefits together with the safety benefits. People can recognise this is a good place to be"* [P4 Staff EC/eProd]. Talking about the use of social media, P3 [Staff nEC/eProd] and P20 [Staff EC/eProd] mentioned that these tools can have a positive impact on the university. What P20 also pointed out is that she was not trying to convince people to change by convincing them they are doing something good for the planet, but rather she was leading other by example: *"I am trying to do a new and exciting thing; saying 'Did you know that we are doing it too. And if we are doing it, you should be doing it'" [P20].*

Secondly, it is important to mention the role of social media and in specific of @SustainableDMU in understanding sustainability. According to P14 [Staff eCons], Twitter or Facebook might not be *per se* sufficient. However, it might mean that once people see the physical application of what the tweet was talking about they can decide to act. Similar opinion for P22 [Staff EC/eCons]: the information read on Twitter or Facebook is relevant for him because it is something that he can remember

even after turning off his device. *"With SustainableDMU especially with something like 'Make sure you turn off your lights' or 'make sure you are using this', that definitely stays in the back of your mind after you read it" [P22].* P24 [Students EC/eCons] is instead more critical. He does believe that Twitter and Facebook can be useful in giving information and raising awareness, however what he is afraid of is that only the 'already converted' environmental citizens would choose to participate in the social media community. This, as seen in the literature review chapter, is one of the biggest critiques to which social media are exposed (Pariser 2011). Although this criticism, P24 is convinced that the activity of SustainableDMU has helped in making DMU more sustainable, at least from the point of view of making people more aware, rather than in directly changing certain behaviours: *"I think the campaign helped. And even those sort of things that I was aware of but haven't really either considered that much or visualised" [P24].*

Third, it is important to understand what participants think sustainability means for DMU. There have been numerous participants who affirmed that sustainability was important for DMU, for a number of different reasons. The first recurrent theme is that a good number of participants tie together sustainability and finance: *"Perhaps the fact that there is less money around might focus people's attention on where stuff has been wasted, so for example switching the lights on at night for nobody's benefit. So that is wasteful. And if you can stop it then you can use that money" [P1* Staff EC/eProd*].* The second theme mentioned by several participants is DMU's sustainable community: P26 [Student eProd] reported how sustainability is not only important to the management level of DMU, but more importantly it is a common value within the general DMU community, which makes it different to other workplaces: *"You don't tend to hear many people going 'Oh it doesn't matter'. I am now used to people taking the more sustainable line most of the time" [P26].* The same idea is reported by P29 [Student EC/eCons]: "*I believe strongly in DMU there is a culture of sustainability when you compare it with other fellow universities*" [P29]. In addition to the other opinions, P32 [Staff nEC/eProd] affirms that DMU has been helping him to become a better environmental citizen: *"DMU is a very sustainable campus. Since I came to university I am more conscious about the environment and this is down to being at*

DMU, because it likes to brand itself as a sustainable university and I think subconsciously that ripped up on me as well" [P32].

As mentioned at the beginning, sustainability at DMU does not come without its critics. For example, P7 [Student nEC/eProd] notes that the main aim of a university should be to improve his teaching standard, rather than to achieve a better environmental performance. In addition to this, some of the people interviewed think that DMU is not interested in being sustainable at all. However, because being sustainable is a '*good thing to do*', then the university promotes itself as a sustainable university in its communication to students and the public opinion. P8 [Staff EC/eProd] thinks that indeed DMU considers sustainability as an important value; however, the effort put into advertising the fact that DMU is pro-environmental is much higher than the effort put into implementing activities and measures to effectively being a sustainable university. *"I think that sustainability for DMU is mainly a sort of PR exercise, which isn't to say that sustainability isn't important for DMU. But I think that the massive outreach which has been put on it is to make it look good" [P8].* P15 [Staff nEC/eProd] has a very similar opinion: *"Actions are better than words, but we are a big PR organisation. If we were sustainable we would have put more money into it and be sustainable" [P15].* P26 [Student eProd] is the most critical interviewees: *"For DMU is a campaign. It's basically just a catch phrase".* He thinks that sustainability is only an advertising activity for DMU and that the reality of the things he sees around the university actually shows that DMU is not sustainable at all and that it does not understand what being sustainable means. Interestingly, if we look at these participants as they rank on the environmental citizenship ladder, only P8 ranks really high, being it on the second last rung of the ladder. P15 and P26 are only slightly concerned about climate change and not very personally engaged in being active to be pro-environmental or ask for a change. However, they could be very critical about the way DMU manages sustainability.

7.3.2 Learning in the social media context

In this section we explore how the participants learnt in the social media context and what makes it different from other types of learning.

First, it is no surprise that many of the interviewees mentioned that they use social media, and especially Twitter, as a source of news, as this is what social media has been credited to be used (Kwak et al. 2010; Petrovic et al. 2013; Becker et al. 2011; Barthel et al. 2015). P2 [Staff EC7eCons] and P7 [Student nEC/eProd] mentioned the fact that there has been a shift in the source of news. They are not consulting news website or watching the news on television anymore, because they can find all the news from social media. *"I don't watch the news as much as I used to. I've learned a lot on Tw, especially in the last 12-18 month" [P7].* And the main point of interest for P2 is that the news on Twitter can spread very fast. The fact that the news on social media can spread very fast is also reported by P32: *"There was an earthquake in America and people received tweets about it 5 seconds before they felt it"* [P32 Staff nEC/eProd]. P25 [Student EC/eProd] in addition mentions that what makes social media special is that the news are given first-hand by the people experiencing it and are not filtered by the views of journalists. This is not a new idea, as today journalists themselves are using social media as a source of news (Broersma & Graham 2013; Vis 2013). In addition to this rather obvious consideration, P9 [Student EC/eProd] added a layer of depth in the analysis: *"I am better informed about some stuff, because of what other people put on their Facebook walls; it's like a filtering system. It helps to filter information through trusted others" [P9].* As such, it is the connection between finding random information and sourcing this information from people that are '*trusted*' that make social media special (the same issue that many journalists face today (Heravi & Harrower 2016). From a different point of view, but on the same topic, P11, a very active social media user and one that critically reflects on what he is doing and trying to achieve, has a strong goal in his '*Twitter strategy*': to make possible for the people following him to know about news and information that comes from non-traditional sources, from sources that his network is not used to get information from, because *"there is no value for the people I know in me retweeting stuff that everybody retweets*" [P11 Staff EC/eProd].

Second, participants pointed out the *way people find information* on social media. P12, as many others mentioned how he is not *active* in searching for information, but he passively receives news; a very new mechanism for learning: *"Generally I don't go*

looking for news, they just turn up and I learn about them" [P12 Student eProd]. P2 [Staff EC7eCons] affirms that the same is true for him, however he distinguishes between Twitter and Facebook. Whereas on Twitter he can apply some filtering by choosing the people to follow, on Facebook the type of network he has and the retargeting ads mostly suggest news and articles that are too random for him. As such, people learn on social media, however the process of acquiring new information is different than in the traditional public participation process as information is received and not researched or requested. It is a passive process where the active research happens at the beginning of the process, that is when people choose whom to follow on social media (the action of curating what information one will be given access to is also called 'produsage' by Bruns (2008). In that moment they choose what type of information they will receive and as such what type of news and information they will learn.

Another view often expressed by participants was that if people are not on social media they could easily miss out on what is happening. P11 [Staff EC/eProd] mentioned that by not engaging on social media it is easy to miss what is happening around . In addition, P11 also affirms that social media is not only important to be up to date, but also to understand what the future trends will be, as a '*forward intelligence*' tool, meaning that being able to pick up the trends in the moment they are starting means that one is able to interpret more easily the future development. This is not a new idea, since social media can be considered as a form of collective wisdom, and Asur & Huberman (2010) have predicted the revenues for a movie by analysing tweets referring to that movie and the sentiment presented in those tweets.

To conclude, it is important to mention that some participants were particularly critical about social media as a source of information stating that there is too much information on social media to be able to use it. Both P2 [Staff EC7eCons] and P20 [Staff EC/eProd] describe one of the most important characteristics of Twitter: its chronological way of showing updates. This makes it very difficult for people to give attention to each tweet that is being sent and make them state that '*tweets get lost*':

"*Twitter is very hectic and I would say I'd read what it's in the first two screens. So some of them go lost" [P2].* This is particularly interesting as tweets are a written form of communication and as such do not get lost (*'Verba volant, Scripta manent'* as the Ancient Romans used to say) and are electronically stored; so in reality they are permanently saved unless one decides to delete them. However, this is not the feeling participants in the study had; tweets do get lost and it is actually very difficult to find them; in the words of P20: *"If you tweet something 12 hours later you've had hundreds of people that you are following and tweeted above that and no one can find that tweet ever again"* [P20]. This can be related back to the discussion in Section 5.3.2, where metrics of engagement derived from the social media platforms during the campaign indicated how during the campaign engagement on Twitter was lower than on Facebook. It was there suggested that the intrinsic characteristics of Twitter could have an influence on this metric. Participants in the campaign here confirm that idea.

Additionally, P14 [Staff eCons] expressed feeling overwhelmed when using Twitter. This is because there is more information shared by the network he engages with than he can actually read and process. This feeling has a definition in digital communication and is called *information overload* (Hemp 2009; Bawden & Robinson 2009); "*The resulting abundance of – and desire for more (and/or higher quality) – information has come to be perceived in some circles, paradoxically, as the source of as much productivity loss as gain".* (Lincoln 2011) *and this can also lead to* '*information anxiety'*, that is the disparity between the information one consumes and understands and the information that one believes he must read and understand.

7.3.3 Learning about other people's or groups' interests and values, but also reflections about one's own interests

This section analyses the impact of social media on people's interests and values and their potential in stimulating reflections about self or other views, opinions or interests.

For P1 [Staff EC/eProd] social media is the place where people express opinions, although they do it in different ways. By sharing opinions people are able to read different points of view and create a more rounded judgment about an issue. A similar view is expressed by P4 [Staff EC/eProd] and P7 [Student nEC/eProd], whereas they also consider this important because this mechanism makes possible to learn about opinions that are not widely diffused and also to understand the point of view of local people regarding a place: *"You get a more rounded view of something on Google, but if you actually search the Twitter feed you get an idea of the places people go to, etc. It's a different way of seeing things. It's the actual reality or the feeling of the place"* [P4]. Or regarding an issue: "*I like to see people responses to things when there is a national event. Different opinions rather than standard opinions that you get from newspaper. I do find like a bit of a window on the world"* [P4]. For P8 [Staff EC/eProd], what makes this mechanism particularly powerful is the fact that opinions and views are expressed in public and that makes them more potent than if mentioned in one-to-one conversations. On this point, P11 expresses an interesting perspective: *"There are moments online when you think 'What is it that I am trying to say? And why am I trying to say it?'. I find it quite self-reflective, because you have to think about broadcasting yourself"* [P11 Staff EC/eProd]. As such, for P11 the fact that one is going to express his opinion to the public audience has the consequences of making him reflect on what he is talking about and why. For P12 the power of social media in influencing opinions lies in the fact that they create non-territorial communities. This means for P12 that people can more easily disagree one with each other without being afraid of being judged: *"We are not right there next to each other, so people are free not to adopt opinions but are free to disagree. So I see a lot of interesting debate between people where they are not afraid to make their point"* [P12 Student eProd].

In addition to the idea that social media are powerful to discover other people's views and opinions that can be important to inform own ideas, P1 [Staff EC/eProd] and P7 [Student nEC/eProd] reported views about social media being a powerful tool for forming opinion per se: *"I have this idea of writing being a useful thing if you are worried about something… if you can write it down it starts to have a shape and you*

start being able to understand it" [P1]. For P1 and P7 it is the action of writing that makes people reflects on their ideas and opinions and that can help them understand things better.

To conclude this section, social media for P11 are a *learning space*: *"It's a learning space. It's about sharing experiences and learning stuff"* [P11 Staff EC/eProd].

7.3.4 Learning about different communication strategies and tools

Here it is explored how people are learning to communicate in a different way, both for professional and personal reasons, through the use of social media. The reasons why participants feel social media are different at communicating with people is also discussed.

One of the first characteristics is that social media are a very direct way of communicating, as it is similar to a text and people would receive it on their mobile phones: *"It's very quick to use and I think it's very direct"* [P4 Staff EC/eProd]. For P2 [Staff EC7eCons], P12 [Student eProd] and P32 [Staff nEC/eProd] one of the most effective features of social media when communicating, especially in a professional capacity, is that people are using social media most of the time and most days. As such if a message is posted on social media people will be able to see it while doing an activity that they normally do. As P32 explains, *"instead of me trying to get them to come to me, I am basically on where they are"*. For P12 what is especially significant is that messages are '*seen*' even if people are not reading them or voluntarily engaging with them they will absorb the message by passively seeing it while scrolling down their screens: "*With Twitter and Facebook it's not something that you can just ignore. Because you are scrolling down it passes through your sight*" [P12].

A second characteristic mentioned by participants is the language used on social media. P3 [Staff nEC/eProd] and P22 [Staff EC/eCons] affirmed that they use a specific language when using social media in a professional capacity. P3 explains that on social media he tries to use the same language his audience use, in this way he can communicate a message that is more effective because it arrives at the same level as

the audience is. P22 uses a very personal language when communicating with the students on social media, so that the message is not seen as a general message, but as a directed and personal communication: *"On Twitter I try to have a personal touch, trying to make sure that I am aiming at the students. So when they see that tweet they will think 'That was meant to me'"* [P22].

A third characteristic mentioned is the fact that social media generated engagement and creates communities. For some participants (P8, P28 and P32) what makes social media very different is the fact that it creates engagement and that it is easier to participate in the conversation than with other types of media. *"With the newspaper and the TV you are more passive, you just listen, stay there, look at it, but with social media it's more efficient, because you can engage"* [P28 Student EC/eCons]. Also it promotes a higher engagement than, for example, emails. *"If I send out 200 emails, I'll probably get 2 or 3 replies. If I post the same thing to Facebook or Twitter, I would probably get 50 or 60 replies"* [P32 Staff nEC/eProd]. In addition to this, P32 points out that people are not only able to participate with the publisher (i.e. the person or institution that is publishing the content), but more importantly people are able to interact with each other: *"It also promotes conversations, because people can see the replies and debate or they can agree"* [P32]. As such, the most significant part is the community created around social media, in line with Piccolo et al. (2014). The importance of the community is specifically mentioned by P29 [Student EC/eCons]. In his words, what made SustainableDMU's campaign effective is the fact that it is visible not only to the people inside the institution, but also to the larger Leicester community, as such creating '*social contagion*' of the ideas (Hodas & Lerman 2014). This makes the activity on SustainableDMU to perform at the same level of sustainability: sustainability in fact has no boundaries; it does not end where the institution ends. With social media it is therefore possible to reach the wider audience and engage them in the conversation. P25 [Student EC/eProd] also identifies as a key component of the use of social media the way in which ideas can spread on these platforms. The key of the diffusion is the social network behind each person; when one person is interested in one idea he will disseminate this idea with his contacts. People that are already interested, but not totally convinced about the

issue will be the one that pick up the message and are then able to spread further along the idea. As such, the diffusion moves inside the network from one person to another.

This second section analyses the critique of social media. P10 [Staff Staff eProd] points out that it is very difficult on social media to understand which messages people have seen and which ones they did not see. Some content can in fact be visible on social media for a long time, whereas other piece of content would disappear immediately (Rodriguez et al. 2014). P23 [Staff nEC/eProd] tries to give an explanation to the point raised by P10. One of the reasons people are in fact not able to see all the messages published on social media is that different people are active at different times.

7.3.5 The ability to practice holistic thinking regarding the issue of sustainability

This final section analyses how participants are able to see the wider issues of sustainability within the context of DMU. Only few people mentioned looking at sustainability from a holistic perspective and interestingly enough, not all of them were Environmental Citizens as from their answers in the interview.

P19 [Staff EC/eProd] talks about sustainability as an issue that includes many different aspects: energy, resources, buildings and more. As such he can see the different implications of multiple activities and actions. P14 [Staff eCons] reinforces what is said by P19; in addition he mentions that sustainability is not only about business and the environment, but also about people. As such he thinks that one should not be talking about '*environmental sustainability*', but more generally about '*sustainability*'.

P9 [Staff eCons] and P25 [Student EC/eProd] add a deeper layer to the meaning of *sustainability* for DMU: they in fact consider that an institution cannot be considered truly sustainable if the community of people within and around it also think and act in a pro-environmental way. *"The university for me is a group, it's a social group and actually to be sustainable, the members of the group have to have a sustainable life"* [P25]. This relates to one of the characteristics of the environmental citizen, specifically *"The environmental citizen believes that environmental sustainability is a*

common good that will not be achieved by the pursuit of individual self-interest alone" (Dobson 2010). As such only a community of environmental citizens will be able to create a truly sustainable institution.

7.4 Moral development

The present section presents the insights gathered from the interviews around the criteria of moral development. The structure of the paragraph is presented in Table 31; here the codes, which have been used to assess moral development, are listed, together with the themes emerging from participants and the interviewees mentioning them. Moral development refers to the process through which participants become more competent to make evaluation about what is right and what is not. This is the moment in which people learn to set aside their egoistic demands and act for the collective ones.

Codes	**Themes emerging from interviews and people mentioning it**			
Being able to respect and adopt the perspectiv e of others Section 7.4.1	I tend not to criticise people on social media	Public visibility of tweets/posts make discussion more respectful	Social media can give you less biased opinion	Although informal, it is still a based on writing form of communication; we need to be careful on how we express ourselves
	P4 P11	P5 P29	P7 P24	P10
Develop a sense of responsibil ity and of solidarity with the group Section 7.4.2	Taking responsibility for communal appliances in the office	Develop a sense of solidarity with people distant in space thanks to social media	SustainableDMU helped to create a community of sustainable people at DMU	Create a sense of community at DMU through social media
	P1 P2 P13 P14 P18 P24 P25 P26 P32	P2 P4 P11	P2 P6 P13 P25 P28	P4 P10 P11 P14 P20 P22 P23
Learn how to integrate new knowledge into the choice of the best	Learning can be hindered by people choosing who to follow and not listening to different voices	Social media are useful in making better decisions	Although it is difficult to make people change ideas, the vast amount of information on social media can have a cumulative	Link on social media stimulate knowledge research and thinking

options Section 7.4.3			effect	
	P6	P12 P27 P24	P1 P15	P5 P12 P30
Learn to cooperate with others to solve collective problems Section 7.4.4	Collaboration on social media with friends and colleagues	Breaking the hierarchical barriers in institution	I tend not to participate in discussion / there is nothing I can do…	SustainableDMU promoted collaboration
	P3 P4 P19 P32 P4 P19 P32	P4 P26 P23	P12 P16	P19 P32

Table 31. Moral development: the themes emerging from interviews

7.4.1 Be able to respect and adopt the perspective of others

Social media can be a difficult and unpleasant environment, epitomised by endless examples in the news of harassment and general un-respectful behaviours (Xu et al. 2012; Carter 2013; Ybarra & Mitchell 2008). Worthy of note then is that during this intervention no example of such behaviours were encountered; people were very respectful when talking one to each other and no aggressive words have been recorded during the data collection.

Participants mentioned the fact that it is one of their '*normal*' behaviours on social media the fact that they do not tend to criticise others. For example, P4 [Staff EC/eProd] explains that this is something that he tends not to do in general in his life (i.e. criticising people), as such he translates his '*normal*' behaviour onto Twitter and tends not to be over-critical. P11 [Staff EC/eProd] mentions something closely related to this research: the ability to tweet about inefficiencies around DMU. He considers that tweeting about it would not be effective, because it would just expose to the public audience the fact that there are people at DMU that are '*lazy',* i.e. that are not doing their job or taking responsibility for sustainability. *"There is no point in tweeting about that. You are just saying, 'Look at the lazy people in DMU that left the lights on'. You don't make a better place by making people angry"* [P11]. For P11 this is not a good solution because the outcome is that people are upset because they are publicly exposed and it is not possible to get the issues resolved. On the other hand,

creating a collaborative environment for P11 makes it easier to improve the situation. From the words of the participants it is possible to see that the offline behaviour was translated into the online one. As such the medium (i.e. social media) does not change their behaviours.

On the other hand, other participants have expressed the opinion that the public visibility of tweets/posts make discussion more respectful. P5 refers to a conversation on the Fairtrade system (the conversation has been reported in Chapter 6. Figure 35): *"I think because it was out in the open as well, maybe that helped to make sure that the arguments back and forth were kind of thought out and structured and kind of referenced to different sources"* [P5 Staff eCons]. He is not reporting his own behaviour, however he talks about the fact that the public visibility of the conversation made it possible for the participants to talk not only in a very polite way, but also using well-structured arguments. This is unusual for social media conversations, which are often not very respectful, as stated by Dahlberg (2001 p. 623): "*many online forums fail to achieve a reasonable level of respectful listening or commitment to working with difference*". The same can be said about referencing arguments to different sources; Dahlberg also states that in online discourse it is "*difficult to verify identity claims and information put forward" (ibid.).* As such it is unlikely that the reason conversations during the presented campaign were very respectful and thoughtful because of the public visibility of tweets, as this is not a reason that stops general social media users to be un-respectful and to not-verify the sources of their arguments.

Another surprising characteristic of social media mentioned by the research participants is that social media can provide people with less biased opinions. Social theories say that biases are inherent to human behaviour, because human behaviour is specifically characterized by a lack of balance, neutrality and critical reflection during arguments. As such one would expect that the same could be said about social media arguments and conversations. And this is certainly true, as many examples have shown that claims, arguments and even evidence are often strongly biased and seldom verified during social media conversations (Schweidel & Moe 2014; Oates &

Moe 2016). This is a topic particularly critical at the present time, given the use of fake news during Trump's presidential elections in the United States. Two participants expressed a very innovative and different view on this topic during the interviews. P7 talked about a personal experience at a very difficult time in his life. He turned to Twitter to discuss with people about what to do as friends and family were too biased and involved in his life to be able to give him an honest opinion. On Twitter instead no one truly knew him and as such people on the network were able to give a more open and as such honest opinion. He said *"Twitter is a very honest place to go and ask. It's very impartial and that's why I like it so much. There is no judgement"* [P7 Student nEC/eProd]. P24 instead reflects on the fact that people on social media not only receive information and are processing and interpreting that information in their own way, but also that they will subsequently often redistribute it (e.g. via retweeting or sharing it with their network) adding their personal interpretation to such information. For P24 this is something positive about social media: *"I think the interesting things is how people interpret information and how they then redistribute that information"* [P24 Students EC/eCons].

7.4.2 Develop a sense of responsibility and of solidarity with the group

As already discussed, social media have been described by participants as a 'place' where it is possible to get in touch and create a network with like-minded people (Dahlberg 2001b), as such people can easily form online communities which they feel part of. In this way it is possible to create solidarity with people that are distant in place, because they have views and opinions in common, or to create a better relation with people within the same institution. For example P4 explains that Twitter is important for him because *"I communicate with the Vice-Chancellor that way quite often and also other people in other departments that I have a necessarily day-to-day contact with them"* [P4 Staff EC/eProd]. Whereas P25 finds social media quite useful because *"you select your own people who you follow, so you tend to get things from people who have your own take on things"*, which is something that "*is not so easy in real life. There is a much more cohesive group of people who think the way I think*" [P25 Student EC/eProd]. As such he has a stronger feeling of solidarity with those

people that have similar views, than with the people that are present in his offline community.

In addition to this, social media can be a useful tool to get and ask for other people support, either online or in the institution department. For example, P23 [Staff nEC/eProd] mentions how different people from DMU tweet him to get support for different activities.

Another point that was repeatedly mentioned by participants was that the social media community of DMU is particularly active. P4 affirmed that this is due to the effort put into it by the Vice-chancellor: "*the Vice-Chancellor has been very encouraging with people to get on Twitter. He uses it, he's got a huge numbers of followers and uses for letting people know what's happening in the institution"* [P4 Staff EC/eProd]. Within the social media community of DMU "*there are quite a lot of people who set themselves as De Montfort related"* [P10 Staff Staff eProd], for example P14 mentioned, *"when I opened the Twitter account I wanted to identify as a person from DMU, so I could connect with other DMU people*" [P14 Staff eCons]. As such, for some people being part of the DMU's online community is rather important. Participants also mentioned that they would help each other to get the message out to the social media DMU community, starting by being engaged one with the other. People support each other not only by following each other on Twitter, as P20 explains: *"Everyone in the office, we would follow each other"* [P20 Staff EC/eProd], but also by interacting with each other's content and making sure that this gets out to as many people as possible: *"what we have done is going on to individually promote each of the videos on our Facebook and Twitter accounts as well"* [P22 Staff EC/eCons]. However, not everyone feels the same; P11 in fact stated that *"none of my social media profiles do mention DMU"* [P11 Staff EC/eProd] and this is due to the type of topics he shares on Twitter. Most of them are political and can be contentious and as such he wants to maintain a distance from DMU and not to be identified immediately as a person from DMU, not only because he thinks that this is the most

sensible thing to do, but also because of DMU's social media policy[23], which limits the way people can express themselves on social media.

Specifically on this campaign, participants also mentioned the important impact that @SustainableDMU has had on the DMU's community. P13 mentioned how @SustainableDMU is a way for "*people who are interested in sustainability at DMU to know how to get involved"* and as such *"it is a way to bring people together"* [P13 Student EC/eCons]. P2 [Staff EC7eCons] and P22 [Staff EC/eCons] added that what was mostly important for them was that it was a DMU account and as such it showed that *"the university cares and it is trying to help people in their day to day lives making a difference"* [P2], although not everyone would agree on this last point as seen in the previous section.

It is visible from the quotes reported how important social media are for creating a sense of community for participants, not only in general terms, but specifically to the institution. Social media can break hierarchical barriers and make it possible to talk, ask help or provide help to different people within the same community, facilitating the creation of a sense of solidarity and responsibility toward the group.

7.4.3 Learn how to integrate new knowledge into the choice of the best options

One of the risks mentioned by participants about learning on social media is due to the fact that people choose who to follow on social media and, as mentioned by participants in the previous section as well, this often means that people will choose to follow like-minded people or accounts, as said by P25: *"you select your own people who you follow, so you tend to get things from people who have your own take on things"* [P25 Student EC/eProd]. In this way they will have access *only* to information and opinions that are too similar to what one is already thinking. As such the risk is that people are not exposed to other messages and opinions and therefore they cannot form a rounded opinion: *"the danger is that you don't reach the one that you need to"* [P6 Student EC/eCons].

[23] http://www.dmu.ac.uk/documents/dmu-staff/pod/people-management-handbook/working-for-dmu/performance-improvement-and-staff-conduct/email-internet-and-social-media-policy.pdf

Although this is definitely true and has been mentioned by various studies (Pariser 2011; Flaxman et al. 2016), P12 [Student eProd] stated that social media have been useful for him in making better decisions because all types of information have an impact on him and because if he "*get more information on the internet I more likely to respond more*". As such, what is key in the process is the amount of information available, not the sources of this information or the tools. The same idea is mentioned by other participants as well: on social media the amount of information that is available is massive, as such it does have a cumulative effect on people's views and opinions. For example P1 mentions the fact that the same idea can be mentioned by many people and so if many people say the same thing, one can start thinking about that issue: *"if there are lots of people bringing similar things to your attention it might make you think about that question or look at that problem and see it as important"* [P1 Staff EC/eProd].

One of the characteristics of social media that is important to stimulate learning and has been mentioned by participants is that it is easy to share links and have a discussion with other people. In addition, these discussions and information are visible to everyone in their network (a phenomenon indicated by studies as social contagion (Hodas & Lerman 2014). For example P30 considers that *"social media can make people aware of things and issues that wouldn't naturally touch their lives"* [P30 Staff nEC/eProd], whereas P5 affirmed that he learnt to integrate new knowledge thanks to a discussion he had with a friend-of-a-friend on Facebook: *"I had an argument on Facebook with someone, following the shooting in the school in America. And even though that argument was a little heated at the time, there is still a positive outcome in the sense that we've both explored more about the subject than other people."* [P5 Staff eCons].

7.4.4 Learn to cooperate with others to solve collective problems

Another important characteristic of a successful participatory process is the ability for participants to learn to collaborate with other. In this section the way in which social media make possible collaboration is analysed. This characteristic is cited by the literature as criteria to evaluate moral development of a participatory process

(Webler & Tuler 2000); nevertheless, this was also an emerging theme identified through the analysis of the interviews.

Several participants, especially the ones particularly active on social media, mentioned that they use social media to collaborate with their friends or colleagues. For example P3, who is a very active member of DMU's social community, specified that when she is working on a project *"I try to get other staff members to tweet about it as well. And we are all tweeting about the same thing at the same time, so we can hit a lot more people"* [P3 Staff nEC/eProd]. P4 instead uses social media, and Twitter in specific, to reach out to students and staff that might be interested in projects his department is running: *"there have been occasions in which I have seen students saying 'I am doing…' and I have tweeted them saying 'If you are doing that maybe you want to come and do that with us and we can support you in getting better at it'"* [P4 Staff EC/eProd]. As such Twitter can be a great resource to find out what other people are doing and to encourage others to take part in different projects within an institution. This is a feeling shared by academics around the world, as findings from Lupton (2014) illustrate.

In reinforcement to this, social media can make it easier to break hierarchical banners in an institution and promote collaboration between different people and departments, in line with what has been found in other organisations (Qureshi & Zigurs 2001 in Weinberg et al. 2013). It is again P4 that mentioned this characteristic: *"Today the Vice-Chancellor spotted an opportunity for us and tagged us on a tweet so we are now going to start a new project"* [P4].

One of the participants also mentioned the fact that what he particularly liked about SustainableDMU was the fact that it was an active presence in the DMU community and that *"you can retweet and engage in conversations as well"* [P19 Staff EC/eProd]. This is considered by P19 as something that is important for an institutional account as *"you can't just expect everyone to take your opinions and your thoughts on board. You have to interact back with those that interact with you"* [P19]. For P19 one of the important aspects of using social media for an institution is to engage with them and to participate in conversations.

Certain participants however, stated that they prefer not to be involved in conversations on social media. P16 [Student EC/eCons] explains that she prefers not to participate in the discussion because it is a *"waste of time"*, especially if she *"does not know the other participants"*. P16 is not a very active digital citizen and does not use social media very often and in a professional capacity. Consequently the different views that people have about collaborating with others on social media are strongly dependant on the use people do have of social media.

7.5 Behaviour change

The present section presents the insights gathered from the interviews around the criteria of behaviour change. The structure of the paragraph is presented in Table 32; here the themes emerging from participants and the interviewees mentioning them are listed. The structure of the present section is somewhat different to the previous section 7.3 and 7.4. Here in fact the section is organised in sub-sections following the themes emerging from the interviews, whereas in the previous sections the organisation of sub-sections followed the criteria for cognitive enhancement and moral development emerging from the literature. The present section analyses if and to what extent the social media participatory campaign nurtured pro-environmental behaviour change in the engaged individuals and as such fostered environmental citizenship.

In Table 32 the participants have been listed following their answers during the interviews. Some of them are listed in multiple sections, as the campaign had multiple impacts on the participant.

Codes	**Themes emerging from interviews and people mentioning it**				
Pro-environmental behaviour change	Change towards a pro-environmental model Section 7.5.1	Reinforcing pro-environmental behaviours Section 7.5.2	Interest in the conversation, but no choice made yet Section 7.5.3	No change in behaviours, because already environmental citizens Section 7.5.4	Did not have an impact Section 7.5.5
	P1 P3 P9 P13	P1 P11 P21 P22	P4 P22	P2 P7 P9 P14	P12 P15 P18

	P23 P26 P27 P28	P28 P31 P32			P32

Table 32. Behaviour change: the themes emerging from interviews

7.5.1 Change towards a pro-environmental model

Several interviewees reported a change in their behaviours as a consequence of the campaign. Some behaviours were reported by more participants, others instead have been recounted by only one individual.

The most popular changes were relative to the #lug-a-mug scheme, the possibility of getting a 10p discount in the coffee shops on campus if using a reusable mug instead of a disposable one, and to food choices. P3 [Staff nEC/eProd], P9 [Student EC/eProd] and P28 [Student EC/eCons] started using a reusable mug after seeing it on SustainableDMU social media accounts. Reflecting on this, P9 stated *"that information is directly relevant to what I am doing and it tells me how to change something"*; as such she was able to change her behaviours towards a pro-environmental model. P9 is a very aware environmental citizen and she said that during the campaign "*most of the information was things that I already knew*"; as such she was motivated to participate in the campaign because she was already interested in environmental sustainability and she is motivated to change her behaviours when the practical constraint of the institution make it possible (or easier) to do so.

P3 is different from P9; she is not (yet) an environmental citizen. In her words: "*to be honest I was really bad at home, I used to leave my laptop on all day plugged in and I wouldn't even think about it. But I am starting to turn it off now and my bill is going down*". As such, the idea of starting using the reusable mug (and of buying a bike, as it will be shown in the continuation of this section) was not completely an effect of the campaign, but more of the culture and example of her colleagues at DMU, however P3 is starting to change her behaviour towards an environmental model. The campaign helped her to change, as she is a very active digital citizen, as such she is prone to participate in the activity of DMU social media community, both online and offline. Through the campaign she learned that she was creating a large amount of

waste and decided to take responsibility for it changing her behaviour: a sign that social learning can be translated into behaviour change.

P28 is an already engaged environmental citizen; she in fact said that her studies (at DMU) "*make me feel that actually I should think about it more and I shouldn't stay passive and think that other people are going to care*". As such she understands her role at DMU and in her private life in taking responsibility for her own actions and she participated in the campaign because she was interested in the topic. The campaign fostered her environmental citizenship by showing her how to be more responsible at DMU through, for example, the #lug-a-mug scheme.

In addition, P28 mentioned a post on Facebook where SustainableDMU tried to foster a conversation about the importance of not using plastic bags when going shopping by asking fans their tips for bringing reusable bags with them: *"There was something about 'what is your tip to not forget home your bag when going shopping?'. Now I always have it with me"* [P28].

Three other participants talked instead of the impact of the campaign on their food choice:

> *"Mainly it was during the week about sustainable food, and I think it made me think more about… So I started to buy local food. I have kept it up. But actually having started eating less meat, and also following the conversation it made me realise 'I am not missing that much'. I probably had the idea that I wanted to change my behaviour but then that information reinforced my idea".* [P24 Students EC/eCons]

> *"Because I read and I learned that by eating less meat I could change my CO_2 emissions. I started buying more organic food and I started to look for seasonal food and thinking more about what I eat, how I eat it and what I should do".* [P26 Student eProd]

> *"I am changing my food buying habits. I don't eat much meat anyway".* [P27 Staff nEC/eProd]

It is evident that the conversation moved participants toward a pro-environmental way of thinking about their food choices. As P24 points out the conversation helped him understand that changing behaviour was not as difficult as he initially thought and it worked as reinforcement in helping him move in that direction. As we have already seen in the previous section, P26 instead is quite critical about sustainability, especially when she is at DMU, as she explains*: "in my personal life I am quite concerned about it, but as soon as I come to DMU I just don't care anymore because I see that whatever I would like to do, I can't do it here, so it's like my brain switches off".* This is due to the fact that she does not see enough effort put by the institution into sustainability, as such she thinks "*I don't feel I have any power to do anything".* During the interview she gave a good example: *"there is one huge lecture hall on my way out of the building and the light is always on and it is closed so I cannot enter and switch the lights off".* This type of behaviour is connected with the idea of who is responsible for sustainability in the non-domestic environment and to the fact that if users perceive that the institution is not pro-active to change, they do also not feel responsible for being proactive and as such for being engaged environmental citizens (similar to the barriers perceived by UK public in (Lorenzoni et al. 2007a).

The campaign also helped in different areas; P27 started buying less water bottles because feeling guilty about all the plastic created: "*I used to buy bottled water and now I bring my water bottle, because I feel guilty about all the plastic, but I would love to go back*" [P27 Staff nEC/eProd]. It is evident that such behaviour however costs her some effort and she does not feel it is totally convenient, as she would prefer to keep buying disposable plastic bottles. P27 is a very controversial participant; she does perform pro-environmental actions because she knows this is what it is expected, but she would prefer not to. Another example: "*I remember to turn the lights off, the computer off, because I don't want to waste energy, I'd rather have them on. I like lots of lights on".* She has a strong opinion about responsibility as human being in working for environmental sustainability: *"we have responsibility as human beings to try not to be destructive which includes putting plastic bottles in recycling, not going to war,*

not killing people, making sure people have health care, all the sort of things that it's about good life, but I don't think we have the ability for the planet to save it".

P3 took the decision of buying a bike after seeing tweets from SustainableDMU promoting the free-lock scheme for all staff at DMU: *"I wouldn't have bought a bike… SustainableDMU was tweeting about getting a free bike lock. So I bought a bike! I would have never thought of it, if I haven't seen it on Twitter"* [P3 Staff nEC/eProd]. This is the case where the information posted was directly relevant to P3 and as such motivated her to change since it was easily actionable. As already observed, P3 is not a very engaged environmental citizen, however the campaign motivated her to change certain behaviours. On the other hand, if we analyse the behaviours she changed (she bought a re-usable mug and a bike) it is evident that she chose to change behaviours that did not demand huge effort.

P13 [Student EC/eCons] mentions in the next quote one of the most successful conversations on SustainableDMU: the hydro-tap and kettle experiment (see Figure 31 page 185). The activity promoted a large interaction on both Twitter and Facebook and it is evident that it did not only remain a conversational topic: *"The kettle-tap experiment; I'd use the hydro-tap anyway so didn't change me, but… If it was the other way around and someone would have told me it was the other way around I would have started to use the hydro-tap"* [P13]. P13 reported that he followed the conversation and was interested in what was the outcome of the experiment, as he would have changed his behaviour accordingly. P13 is a very active environmental citizen; when asked what he was doing at DMU for sustainability purpose he said "*I don't know what else I can do, really*" and when asked who was responsible in his opinion for sustainability he replied: "*Essentially everybody. Everybody has got a part to play; if you're coming in here and you've got an office with lights and a computer then you've got saving the environment*". As such he was open to be influenced by SustainableDMU.

The last example presented shows how the campaign did have an impact on P1, not in moving him to change a directly relevant behaviour, but in helping him to feel more part of SustainableDMU community: *"I did go on the organised lunchtime*

walks… I heard about it through Twitter" [P1 Staff EC/eProd]. P1 mentioned going to the lunchtime walks, a scheme organised by the sustainability team at DMU. Going to the walks does not directly have an impact on P1's pro-environmental impact, but does position him in a group of pro-environmentally minded people and increases his sense of belonging to DMU, which refers to what ha already been mentioned in Section 7.4.4 about DMU's users learning to cooperate within the DMU network thanks to the campaign.

The quotes presented show how the campaign helped participants in changing their behaviours towards a pro-environmental model. It is evident that the behaviours changed were small and the campaign was successful in changing mainly easy actionable behaviours, although the campaign did not target any specific behaviour, but focused on a wide range of pro-environmental significant actions. It is interesting to see that many changed in relation with eating habits, which is a fundamental action human beings perform during their daily lives, but was presented as to be easier than stopping buying plastic bottles. The most successful behaviours were actions that were directly relevant to DMU: the #lug-a-mug scheme, the free-bike lock, the lunchtime walks or that were intimately relevant to participants: their food habits. This refers back to the insights about what was the most successful topic of conversation on social media during the campaign, as presented in Chapter 5, Section 5.3.3. In this section, it emerged that the most successful topic at creating engagement and conversations, especially on Facebook (see Chart 16), was exactly DMU.

7.5.2 Reinforcing pro-environmental behaviours

The campaign was also considered to have another positive impact on participants; various interviewees stated that although they did not change their actions, the campaign worked as a reminder of pro-environmental behaviours for them.

Some participants, such as P1, P21 and P31 stated that the campaign was a reminder of good practices and it showed and promoted further steps down the road of pro-environmental behaviours.

> *"They do put out little pulses of information which remind you 'Don't forget sustainability and here there is another way of looking at it'"* [P1 Staff EC/eProd]

> *"I made more of a conscious effort to switch things off and other stuff. It was useful to be reminded that those were good practices"* [P21 Staff EC/eProd]

> *"A lot of them I kind of already did anyway. So it made me think 'Well, can I recycle a bit more, or can I do something more?'"* [P31 Staff EC/eProd]

These three participants were already very aware environmental citizens and the campaign was important to them because it revealed that sustainability was important to the institution and not only to them; it made them feel rewarded for the effort they were putting in being pro-environmental citizens motivating them to '*do something more*' [P31]. Motivating environmental citizens to expand their actions is easier than motivating non-environmental citizens to start behaving pro-environmentally, as the choice of being attentive to the environment has already taken place. On the other hand, in an institutional context already engaged environmental citizens often feel they are doing their part and that they should not be asked to expand on their actions because they are already doing everything in their capability, as other participants revealed (and will be illustrated in Section7.5.4). This was not the case with the above three participants.

For other participants the campaign worked as a reminder:

> *"I think that I did not changed the way I am because of it, but it would remind me to switch the lights off before I leave, or… Which is usually in my habit, but if you see a reminder it's easier that you do it"* [P32 Staff nEC/eProd]

P32 is not a very engaged environmental citizen; as he said "*I am not an eco-warrior and I don't tend to be and I don't want to be*". As such for him, performing pro-

environmental actions is the expression of the norm at DMU: "*DMU makes an effort to be sustainable and obviously I think subconsciously that ripped up on me as well*". On the other hand he is a very active digital citizen, working with social media and always checking notifications on his phone (as he mentioned multiple times during his interview).

As it is evident, social media can be effectively used as a reminder of pro-environmental behaviours in large organisations; it is possible to send a well-timed tweet to remind employees to switch off computer and lights when going home or in particular occasions (e.g. holidays). People are most likely to check their phones at the end of their working days as such this can be a powerful tool to start and reinforce good habits. It is key because it does not introduce a new behaviour for people, instead it uses actions that people already do (i.e. checking their phones and their social media accounts) to foster pro-environmental actions. However, it might have an impact only in very active digital citizens, such as P32.

For P22 and P28 the campaign did not work as a reminder in the moment the behaviour occurred, rather it worked as a reminder of good action and reading it on social media reinforced their conscious effort:

> *"Especially with something like 'Make sure you turn off your lights' or 'make sure you are using this', that definitely stays in the back of your mind after"* [P22 Staff EC/eCons]

> *"… trying to boil the kettle as much water as you need, no more. I've done it before, but when I've seen that I said: 'Actually, I'll stick with that'. It was not a complete change, but that's a thing I'll always remember because I've seen it there"* [P28 Student EC/eCons]

Being involved in the conversation stimulated participants in being more dedicated to pro-environmental behaviours. As such social media can be a powerful tool in creating a community of people that can mutually reinforce positive environmental actions. Whereas P28 is a very active and attentive environmental citizen, this is not

the case of P22; this participant is not completely uninterested about environmental issues, however she is not particularly enthusiast and could use an external reinforcement. During the interview she said that although she was "*doing what I can in terms of switching the computer off and that sort of things*", this sort of actions was not a priority for her. This is for P22 linked to the fact that saving energy is not part of her routine, so she would appreciate help in "*rather than thinking 'I need to make time to know what to do, but I don't know how', in making it part of my routine*".

In addition, the campaign was a resource for P11:

> *"I think I am already being green, but with these core things you can put your team to it. Because having a range of resources to say 'Actually you have to follow that on Twitter and if you are on Facebook you should like that. And you need to go read this and this and this"* [P11 Staff EC/eProd]

P11 is an environmental citizen, as such the campaign did not help him in being a better citizen, however he found it useful because that was a resource to share with his colleagues and team members to make them understand what are pro-environmental behaviours and to promote action.

It is evident that social media can be beneficial for environmental citizens as well as for non-environmental ones. They can work as a reminder and as a resource for large institutions and can be used to start conversation about sustainability among colleagues and team members. Moreover, they can help in presenting sustainability as a core value of the institution and that help people feel part of a community of interest and in understanding what is the expected norm-behaviour, making it easier for non-environmental citizens to adapt to them.

7.5.3 Interest in the conversation, but no choice made yet

In some cases the campaign did not stimulate participants in changing their behaviours; however, they followed the conversation and were engaged in listening and participating in it.

P4 [Staff EC/eProd] for example reported to have started thinking about some of the issues and behaviours communicated during the campaign: *"Quite often there are some interesting tweets about environmental sustainability. There are certainly things that have got me thinking from them…"* [P4]. This is a sign of cognitive enhancement, one of the key factors of social learning in participatory processes; people learn about other people's values and reflect about own interests. A tweet can therefore be a stimulator of cognitive enhancement (Section 7.3.3). P4 is a very engaged digital citizen, whereas he is less engaged in environmental issues. As he says "*Twitter is part of my life now*" and he believes that it is a "*good forum for discussion*", as such he is open to be influenced or change behaviours for something that he reads or discusses about on Twitter because*: "somebody may raise a good point*".

In addition, P22 [Staff EC/eCons] reported not only to have started reflecting about certain behaviours, but that he started thinking that there are certain actions that he is willing to start doing: *"Before I leave work I make sure that the monitors are off, that the lights are switched off, nothing is left on if it doesn't need to be. But there are other points that recently came out and I have been thinking I should start doing them"* [P22]. This is a sign of social learning, in particular of moral development: to learn how to integrate new knowledge in the choice of the best options. P22 learned something new following the conversation and he is learning how to integrate that knowledge into his actions (Section 7.3.1). As previously said, P22 is open to be influenced by SustainableDMU as she was looking for someone or something to help her became more pro-environmental.

It is evident that social media are able to foster social learning in engaged participants; social media can in fact foster thinking and reflecting about certain issues and about personal actions. This not always translated into behaviour-change, as in the cases presented in this next section.

7.5.4 No change in behaviours, because already environmental citizens

Two groups of participants reported no change in their behaviours as a consequence of the campaign; the first group is composed by environmental citizens who did not

change because they claimed to be already behaving in a pro-environmental way, and it is presented in this section.

P2 [Staff EC7eCons] explains how she was engaged in the conversation happening on SustainableDMU as in fact she was in retweeting and commenting; however she also said that she was already behaving as an environmental citizen as such she did not feel motivated to change. For example, she mentioned retweeting a tweet about lights and the reason she was doing it was because "*I don't know how much of impact my personal Twitter has, but I do tend to retweet the sustainability stuff quite a bit, because I think it's quite important*". As such P2 is convinced that retweeting this kind of information could have an impact on the people that engage in conversations with her.

The same kind of response was reported by P7, P9 and P14.

> *"No I didn't find anything useful in what SustainableDMU was tweeting; I think I am quite aware of things I can do in my environment"* [P7 Student nEC/eProd]
>
> *"Most of the information was things that I already knew"* [P9 Student EC/eProd]
>
> *"I wasn't highly interested or disinterested in it, but I do try my best to do as much as I can at work, and also at home already"* [P14 Staff eCons]

As it is evident, these participants did not find the campaign personally useful or important, as they were already aware of the posted knowledge and already engaged in pro-environmental behaviours.

P1 [Staff EC/eProd] explained that the campaign did not affect his behaviour, because he and his colleagues are already aware of the importance of saving electricity in the office and have already taken the necessary actions: "*We've reached in the office the level were we do switch the lights off, or we don't switch things off, but it's probably going to stay like that until some other external things change*". He also adds that the

only way to move further in a pro-environmental direction would be to change some external barriers (e.g. the type of computers they use, or the type of job they perform) that are not dependent on his/his colleagues willingness to change.

P6 [Student EC/eCons] explained why he tended not to look at pro-environmental information posted on social media: *"I know that we were encouraged to do things, but I didn't really pay attention to those things. I think I am doing quite a lot of sustainable stuff anyway. So I tend to not look to that because I feel I am doing quite a lot, that I behave quite sustainably"* [P6]. This is a key position for this study; it is in fact true that the campaign recruited in majority people that were already interested or engaged in pro-environmental behaviours (like-minded people – see Chapter 6, Section 6.2.2). If it is true that those are the people that mostly would follow an environment-centred social media account, but then they are not encouraged to follow the conversation as they feel they are already '*doing quite a lot of sustainable stuff anyway*' [P6 Student EC/eCons]. As such, a participatory process on social media is effective when it engages environmental citizens in the promise that they will share the resources and encourage interaction from their circle of friends/followers that might take action, because not already as engaged as the core group.

7.5.5 No impact

The second group of people who did not change behaviours as a consequence of the campaign are non-environmental citizens, who were not motivated to change.

P18 reports not changing his ideas or behaviours as a consequence of the campaign.

> *"No I haven't changed an idea or a behaviour. Not that I could remember"* [P18 Staff EC/eCons]

However, the main problem reported by participants in this group was that they either were not able to see the conversation because it did not show in their feed [P12] or that they do not remember what was happening (although they interacted with SustainableDMU during the campaign and were interviewed only one/two months later).

> *"I couldn't see that much. It might be something wrong with my Facebook, but as far as I could tell it was just a group"* [P12 Student eProd]
>
> *"I don't remember SustainableDMU tweets. I don't know, I don't remember my own tweets…"* [P7 Student nEC/eProd]
>
> *"I don't remember… I only see the recent stuff, it's not that I didn't read what SustainableDMU put on Facebook, I just look at different stuff and…"* [P15 Staff nEC/eProd]

This happens because as P32 explains: "*To be honest I don't remember much about them, but again it's because I am bombarded by social media everyday"* [P32] (although P32 reported changing some behaviours as an outcome of the campaign). On social media there is an overload of information (Bawden & Robinson 2009) and conversations happening at the same time and it is difficult for people to focus on following a particular account. As such another issue with a participatory process on social media is that although people have subscribed to participate in the process (by liking the page or following the account) they might not be committed to effectively participate in the process; as such no social learning or behaviour-change will happen as an outcome of the process.

7.6 Summary of the chapter

As presented in Section 7.2 the main groups of participants who engaged in the participatory campaign were environmental citizens and digital citizens. The first group participated because they were already interested in sustainability, the second because these are the people who are very active in the social media community of DMU. Figure 43 presents the impact of the campaign on the participants: in green interviewees who reported a positive impact, in red participants who reported the campaign did not have an impact, in grey the ones who did not report anything.

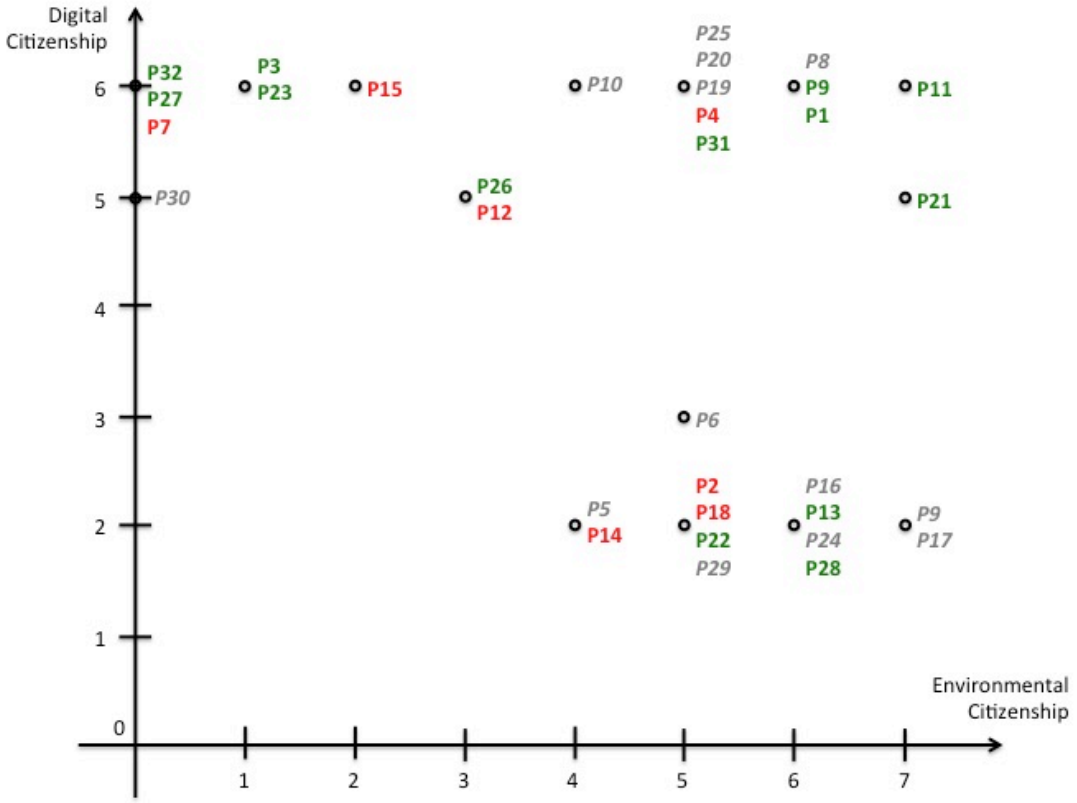


Figure 43. The impact of the campaign on participants; in green interviewees who reported a positive impact, in red participants who reported the campaign did not have an impact, in grey the ones who did not mention any impact from the campaign

As it is evident from the above figure, the campaign had a stronger impact on digital citizens, either they were already engaged environmental citizens or not. The majority of the people that in fact reported a change in behaviour or a reinforcement of pro-environmental actions was at the top of the digital citizenship ladder. At a first analysis this could look contrasting with what was presented in Chapter 6 (Section 6.2.2), in which from the quantitative and qualitative analysis of the metrics obtained from Facebook and Twitter it was shown that pre-interest on the subject is the main motivation for interaction, suggesting therefore that the main impact of the campaign would have been on the already-environmental citizens, as they were the one that mostly followed the account and that were the most active during the campaign. On the other hand, one of the main reported reasons for inaction from the environmental citizens was that: "*Most of the information was things that I already knew*" *[P9 Student EC/eProd].* As such, although more engaged in the conversation because of more interest it was easy to predict that the reported impact of the campaign on these participants would have been moderate.

In addiction to this, it is important to reflect on the type of behaviours that participants reported to have changed:

1. The #lug-a-mug scheme;
2. Not using plastic bags when going shopping;
3. Making better food choice;
4. Buying less water bottles;
5. Buying a bike;
6. Feeling more part of SustainableDMU community.

Behaviours 1 to 5 fall into Stern's (2000) definition of private sphere environmentalism; that is "*the purchase, use, and disposal of personal and household products that have environmental impact*" (Stern 2000, p.409). More specifically they can be considered *"green consumerism behaviours"* (ibid.) as they involve purchasing practices that take into consideration the environmental impact of the production processes. Although these actions can seem to the individual participants as a valuable engagement in reducing their impact on the environment, as Stern states the real environmental impact of these individual actions is small and they have an environmentally significant impact only as long as many people do the same thing. As such, it is difficult to argue that the reported actions will contribute to the reduction of the negative impact of DMU on the environment. On the other hand, these actions become significant once a big enough number of people do the same thing and the present research has shown that social media can be a powerful tool to increase awareness and as such to get more people to perform the private sphere behaviours.

The findings presented in Section 7.5.2 strengthened this view. As reported by participants in fact:

1. The campaign was a reminder of good environmental practices for both environmental and non-Environmental citizens and as such social media can be effectively used as a reminder in organisations.
2. The campaign showed participants that sustainability was important for DMU, therefore motivating them to improve their contribution to the issue,

demonstrating that it is possible to reinforce good habits through social media and that social media can be a powerful tool in creating a community of environmental citizens that can mutually support positive environmental actions.

3. The campaign was considered a resource to be shared with others to invite them to perform pro-environmental behaviours, corroborating again the idea that social media can be effectively used by organisations to create and enlarge the community of environmental citizens.

To conclude, it is important also to consider the reasons presented by participants for not taking action following the campaign. The first group was composed of some environmental citizens, who stated that the campaign was not helpful for them, because they were "*doing quite a lot of sustainable stuff anyway"* P6 [Student EC/eCons]. The second group of participants that did not take action instead were non-environmental citizens who stated that:

1. They were not able to see any activity from SustainableDMU on social media;
2. They did not remember any campaign from SustainableDMU, although they participated in the conversations and the interview took place only 1 month later;
3. They were not able to see the campaign of SustainableDMU because very active digital citizens and as such there was too much things taking place on their social media.

Therefore, it is important to warn organisations that wish to utilise social media for promoting sustainability that these tools are not capable of reaching everyone in the university and also that although people choose to follow one account the commitment of participants engaging through social media can be very superficial.

8 Smart citizens using social media in organisations

This thesis documents a case study action research undertaken to explore the potentialities offered by *participating* in decision-making regarding *pro-environmental issues* as they are mediated by *social media,* in *a UK higher education institution*. As such it sets itself in the current debate about the use of technologies and how pervasive they can be from an institutional point of view. Starting from the idea that "*organisations don't use energy, but people do*" (rephrasing from Janda 2011), it evaluates the role for digital technologies in making people smarter, trying therefore to empower them, rather than their environments.

As presented in this thesis, ITCs have the potential to change the way human beings relate with organisations, buildings and the environment. The Internet of Things (IoT)[24] made everyone and everything connected and revolutionised the relationships between human beings, between human beings and things and between things (Santucci 2010). The IoT is pervading our lives at an increasing pace. In 2008 the number of 'things' connected to the Internet exceeded the number of people connected to the Internet (Evans 2011). Today there are nearly 12.6 billions connected devices, including data, processes, things, and people (Miranda et al. 2015). Among the 'connected things' it is possible to find tablets and smartphones, but also desktop computers and laptops, smart TVs, printers, refrigerators, and so on. Hence, now things can talk and connect not only with people but also with each other.

Although the general perception is that the Internet and social media have been a good thing both for people and for society[25] (Pew Research Center 2014), many

[24] The IoT is defined as "A global, immersive, invisible, ambient networked computing environment built through the continued proliferation of smart sensors, cameras, software, databases, and massive data centers in a world-spanning information fabric known as the Internet of Things". (PewResearchCenter 2014a, p.1)

[25] See the Pew Reserch Center report about the future of the Internet published in occasion of the 25th anniversary of the invention of the World Wide Web http://www.pewinternet.org/2014/02/27/the-web-at-25-in-the-u-s/ accessed on the 26th March 2017

concerns exist and are connected with issues of privacy, security[26], and trust, but also of human dignity and social inequality. Devices connected with the Internet are very vulnerable as human control is limited and as they are expected to do things that nobody designed them for, but which might be undesirable (PewResearchCenter 2014a). In a more desirable IoT scenario, technology would learn from people, consider the context and be proactive in modifying its settings according to the situations and the expectations of users (Miranda et al. 2015). Enabling this scenario would mean moving from the Internet of Things to the Internet of People (IoP).

This research challenges the top-down perspective that relies on smart-buildings (and technology to a wider extent) to solve society's environmental problems, promoting the role of *'smart-citizens'*, that is active, engaged and committed citizens, in promoting sustainability at home, in the workplace, and in the city. The digital tools and social media in particular are seen as facilitating and supporting the process of engagement. As such, the research started not by refusing technology, but by stipulating that a better use is possible. So what are the conclusions that we can derive from this study? Do social media make people more aware, better educated and more engaged about pro-environmental issues in their institution?

Technology does not change people's behaviour; people do change their own behaviour. As such it is important to stop obsessing about smart objects and start thinking in a smart way about people. Devices are the interface, that today is almost becoming a natural one, that connects people to the world outside. As such, things are a reflection and representation of their owners; however, devices have the capability of learning and acquiring a large amount of data about the owner's context.

First, the Internet of People should be *social* allowing first people, but then also things and devices to participate one with the other. People will need to be empowered to modify and adjust the preferences of with whom and when their devices can socialize. Second, interaction needs to be personalized, meaning that the information

[26] Issues of trust and privacy were mentioned by participants during interviews, however they have not been mentioned in the present document as they did not refer to the main aim of the study.

learnt by devices should be used to create sociological profiles of their users and also provide an easy customisation, allowing to protect privacy. Third, IoP needs to be proactive, meaning that technology should be used as a support to people's interaction with their environment.

8.1 Fairness, competence and social learning on social media

> *"Our social tools are not an improvement to modern society, they are a challenge to it."* (Shirky 2008, p.107)

The theory of Public Participation has been applied to the present study, because as Webler, Kastenholz and Renn (1995) stated "*when citizens become involved […] they mature into responsible democratic citizens*" (ibid., p. 444). Would DMU staff and students become, or become better, environmental citizens through engagement around environmental issues at DMU on social media? The principles of fairness, competence and social learning have been used to analyse the data collected and to make sense of the data itself.

8.1.1 Fairness

From the results presented in Chapter 6, which perfectly align with Dahlberg (2001), it was evident that social media shares many of the constraints of traditional public participation processes: first the issues of the recruitment of participants (Petts 2006), which from an initial (and very optimistic) analysis of social media seemed the easiest thing to solve and also the major power of the digital technologies (Dahlgren 2011; Castells 2007). In the present research, social media have been able to enlarge the overall audience that was in contact with the Sustainability team at DMU (as the community size of SustainableDMU doubled in only eight weeks), however they engaged people who shared similar interests or who already knew someone in the group (in line with Dahlberg 2001a). Precisely in the same way as it happens through traditional recruitment. In addition to this, the internal procedural fairness of the meetings is also similar; some voices are more heard than others (Petts 2006).

The tendency of organising participants in like-minded communities (Dahlberg 2001b; Pariser 2011) cannot be resisted on social media; quite the opposite, filtering of information is one of the biggest challenges (and achievement) of social media services. Facebook, Google and the like are continuously improving their algorithms to show people information, news and content that is personalized, meaning that is based on previous engagement and individual interests. As such people will be increasingly involved and engaged in like-minded communities, decreasing the opportunities for learning and growth. This phenomenon, also called '*social filtering*' (Pentina & Tarafdar 2014, p.212), not only affects which news individuals will be exposed to, but may also undermine civic discourses because it provides more information that supports and confirms one's pre-existing views instead of amplifying them and as such limits the exposure to challenging and enriching beliefs (Pariser 2011).

For the goal of this project this means that people already engaged about sustainability (which have here been called environmental citizens) will be more likely to take part in the process, hindering the outcome of the process. The only way to overcome this barrier is if the recruitment of participants is performed through selecting participants based on their interests and their engagement is continuously fostered.

8.1.2 Competence

Relating to the competence of the process, what stands out from the current evaluation is that discourse on social media are very superficial and far from Habermas's '*ideal speech situation*' and of communicative competence that make possible social learning and the nurturing of citizenship. Except for a couple of occasions that have been presented in Chapter 6, engagement was difficult to nurture, participants did not particularly enjoy discussing about the proposed topics, and when they did they contributed in a light-hearted way (a '*point-and-click*' participation as van Dijck (2012) call it), which can critically compromise the deliberative power of the process itself. As expressed by (Dahlberg 2001a): "*reflexivity is often a very minimal part of cyber-deliberations".*

As mentioned by one interviewee, participating in conversation on social media can be a *"waste of time"*, especially if one *"does not know the other participants"*. This is one striking difference between social media and traditional processes; it is very difficult to facilitate the virtual meetings and to promote engagement and trust among participants. Participants are not together in a room; they have not committed to participate in a meeting for a certain time; they are reached by SustainableDMU's tweets and posts during their daily activity, which might endanger their participation and the intensity of their involvement, as in line with the findings by (Baek et al. 2012) who analysed online versus face-to-face deliberation and found that online discussions are less constrained and less structured than face-to-face ones and they generate less agreement and do not require consensus and follow-up actions. As such, online deliberation seems to be less effective than offline debates.

8.1.3 Social learning

In Chapter 7 several interviewees reported a change in their behaviours as a consequence of the campaign or a reinforcement of already existing behaviours. It is argued that this is evidence of social learning and of enhanced environmental citizenship. However, the changes were minor and it is here difficult to advocate that the reported actions will contribute to the reduction of DMU's environmental impact in a measure that is relevant to the requested target of 10% reduction on 1990 levels to reduce carbon emission of the HE sector (HEFCE 2009). In addition, the success of a participatory process also depends on what the people outside of the process perceive because participation can and should affect participants' social networks (Bull et al. 2008). Participants mentioned that they actively use social media to be affected by their social network and that social media are powerful to discover other's people views and opinions that can be important to inform their own ideas (see section 7.3). However, only a few of them were active in trying to affect others with their ideas. 'Social contagion' (Christakis 2008) did not happen during the presented participatory process, which hindered individual social learning and behaviour change.

Another type of learning was also in evidence: organisational learning. The Sustainability and Transport officers at DMU were highly involved in the process, being the ones who wanted to start it and who facilitated its creation. They were the participants that benefited the most from the process, learning about the community at DMU, learning about how to better communicate with people about sustainability on social media and how to cooperate with others around the university to solve specific issues related to environmental performance of DMU. On the other hand, DMU's community also learned how to report issues to the Sustainability team using social media, participants learned how to communicate with each other in a constructive way and that SustainableDMU was the 'place' to go for environmental topics.

> *"Unlike sharing, where the group is mainly an aggregate of participants, cooperating creates group identity."* (Shirky 2008, p.50)

As discussed, social media can be effectively used to build communities of intent within organisations where most of the learning achieved is from the institution point of view rather than the individual one. Going back to the question presented at the beginning of the chapter: Do social media make people more aware, better educated, and more engaged about pro-environmental issues in their institution? The answer to this question is affirmative only to a certain extent, despite the premises of the study; however it does make the institution to be more aware, better educated and more engaged about the pro-environmental attitudes and behaviours of its staff and students and as such it makes it easier to engage them through different strategies. Social media are just one of the tools available to institutions and quite a powerful one in understanding the community of engaged citizens.

8.2 How can we be smart about using social media to encourage sustainability in organisations? Key recommendations

Five key recommendations can be found for individuals, organisations and policy makers who wish to use a participatory and collaborative approach to develop 'smart citizens' using engagement on social media:

1. Recognise the limits of social media. Social media are a tool that is widely used and is an expression of our society; however, they are not capable by themselves to initiate revolutions, change the outcome of elections, or transform people of an institution into environmental citizens. Recognising and addressing the limits of this approach by incorporating social media campaigns within a wider participatory campaign can bring the outcome of the process to a higher level.
2. Recruit the 'right' group of people and set times and 'places' for meetings. One of the biggest constraints of the present research has been the fact that people have been left excessively free to participate (or not) in the process. Recruitment is key for a participatory process for achieving fairness and engagement; the same is true for a process on social media. In addition setting a time and place for meetings to happen can solve the problem of low participation and commitment, which affect the competence of the process. An example could be the use of Twitter chats or of closed Facebook groups for the discussion to happen and in setting these virtual meetings at convenient times for the group.
3. Hierarchy is an important element of social media engagement; it is important to use this for the advantage of the process. As such, it is important to invite influencers, that is people that have a large reach and can stimulate people to take action, to take part in the conversation, or at least in spreading the message about the process.
4. Collaborate with building managers, head of the institution, and the relevant stakeholders for managing the organisation. Collaboration with people that can solve issues and take decisions is key for the success of a participatory

process, to let the participants have agency to intervene and change the current condition.

5. Incorporate social media in the wider process of achieving energy reduction and reducing the environmental impact of the institution. Social media can reach people that are difficult to reach otherwise, e.g. the campaign was able to reach many students, who were the group most difficult to engage according to the Sustainability officer at DMU. As such, using social media for spreading the message, raising awareness and also nurturing participation and collaboration can be effective, but cannot be used excluding other tools.

8.3 What questions are unanswered that future research could usefully explore?

Learning from the present research, three areas of investigation for future research can be identified to better understand how to use a participatory and collaborative approach to develop 'smart citizens' using engagement on social media:

1. One of the critical points of the current research was that participants were given the opportunity, but were not required, to participate in the process. The campaign happened on social media and participation was fostered through different mechanisms; however, the research did not start by recruiting a group of participants that would engage on social media. The reason was really simple: given the big claims placed on social media of being a democratizing force in society, the research wanted to test if a high number of people would participate in the process in addition to understanding at what level they would be involved. However, this had the counter effect that the people that participated in this process were not as committed as people in traditional participatory processes. As such it would be interesting to see if a research that would start from recruiting a group of participants will have the same outcome.
2. One of the strengths of social media is the fact that interaction is visible not only to the participants group, but also to the wider public. In addition to that, the wider public can also take part in the conversations and process by

expressing their views on different aspects. This is something that happened to some extent during the present research specifically on Twitter, when people, who were connected to the participants, but were not part of DMU's community, took part in the conversation. An interesting research topic would be to understand what is the impact of a participatory campaign outside the community group and the chosen audience, to understand if the impact of a process happening on social media can have an impact, an to what extent, on the peripheral community.

3. The present research was also limited by the fact that true deliberation power had not been given to the participants. The Institution collaborated with the implementation of the campaign and had been supportive in responding to comments and critiques. However, participants were not given a specific case where to deliberate on or a specific problem to solve within the university. Running a deliberative process in an institution would be very insightful, given also the vast constraints that the institution will face: issues of privacy and of disclosing confidential information to the public, difficulties in organizing the process and made every voice equally heard, complications in making people participate in the conversations at the same time or in making possible to easily follow the discussion.

8.4 Practical issues in conducting a social media campaign: lessons from experience

8.4.1 Interaction with the institution

The Facebook and Twitter accounts were launched together with the Sustainability and Transport Officers at DMU. Moreover, SustainableDMU was an expression of DMU as an institution. This had different implications:

1. DMU has a policy for social media use[27]. Therefore the type of information, the tone and the form of communication on social media had to adhere to the policy;
2. Being the expression of an institution the communication could not (and did not want to) be excessively critical regarding the institution itself, because that could have lead to obvious reaction by other members of it. On the other hand the account activity encouraged users to report issues arising around university, committing to resolve them and doing so in most of the cases. This is one of the reasons a collaboration with the Sustainability Officer, who closely worked with the Energy Manager, was sought.
3. The other main reason for asking the collaboration of DMU was that the campaign wanted to gain the widest audience possible and to be attributed a reasonable credibility and trust around the issues of sustainability by the audience itself. This was the reason the campaign has not been conducted via the personal researcher's account, which had a smaller audience and whose activity around the problems of sustainability at DMU would have been considered in a different way from the audience, that is not as an expression of DMU itself and therefore the idea of '*creating a place for staff and students to discuss #environmental and #sustainability issues at #DMU*[28]' would have been more difficult to achieve.
4. Moreover, the issue of the public dimension of posts on social media is critical. Institutions are concerned about what can be said about them on the web, especially if it is negative, because it could have an impact on their reputation. Before social media public relations were less problematic as it was easier for institutions to control what and how much information about themselves to share to the public. In the contemporary age, where everybody can share thoughts and ideas and where everyone can potentially reach

[27] http://www.dmu.ac.uk/documents/dmu-staff/pod/people-management-handbook/working-for-dmu/performance-improvement-and-staff-conduct/email-internet-and-social-media-policy.pdf accessed 28th March 2017

[28] This is the bio of @SustainableDMU on Twitter and Facebook.

(almost) everybody, it is difficult or almost impossible to control the information that is shared about one institution. Therefore, transparency is a conflicting issue in institutions that want to be trusted by disclosing more about themselves, but at the same time are aware of the risk of transparency and openness. This was repeatedly mentioned by participants during interviews.

8.4.2 Downloading and managing the data

The use of free tools has been one of the main interests in conducting the evaluation of the social media campaign, and it has also been the main source of complications. There are many costly data mining tools available for marketing purpose, but the aim of the research was to design a methodology that public institutions with tight budget could use and from which they could acquire the maximum benefits. However, it is necessary to note that this choice had many consequences: first, it was necessary to use many different tools, whereas all the data could have been aggregated by only one social marketing tool. Second, almost no support is provided by free tools developers, therefore the process of learning to use the online software and its potentialities can be problematic and sometimes confusing. Third, it is very time consuming; during the social media campaign it was in fact necessary to manually download data every week because the free software did not give the possibility of keeping track of interaction for a period longer than a few months and in some cases it was tracking for only one week at a time (e.g. TweetArchivist). This is not only time consuming, but can lead to missing data due to the non automation of the system. Finally, many software start as free, but afterwards change to a payment method (an example is Crowdbooster, which became a paid tool after the end of the campaign).

8.4.3 Managing the campaign

As said managing a social media campaign is not an easy task. Not only was it necessary to prepare relevant, referenced, but also easy to understand material for the dissemination of information; in addition to this it was necessary to reply hour by hour, and sometimes minute by minute to messages from participants, in the most

appropriate way. Interaction from the campaign had not been massive, however everyday many messages were coming through Twitter and Facebook and each needed a reply. Another main challenge in the promotion of engagement was to get people motivated to engage with the campaign, in line with what has been found by Piccolo et al. (2014)

9 Conclusions

The research presented in this thesis aimed to address the issue of environmental sustainability associated with the higher education sector in the UK. The sector does not account for a huge fraction of total UK emissions, however higher education institutions can play a unique and fundamental role in educating future generations in environmental conservation and can lead by example through the employment of best practices in the management of their estate.

The study focused on the impact of staff and students pro-environmental behaviours to reduce a UK higher education institution's emission. To generate behaviour-change the two correlated theories of public engagement and environmental citizenship were used. Public engagement processes are predicated to be able to change people's attitudes and behaviour toward a pro-environmental model and are, by scholars, considered a possible method to nurture environmental citizenship. They are based on Habermas's theory of communicative action that understands language as one of the fundamental component of society; as such communication is considered to be able to bring about change. That is what public engagement processes do; they bring people together and let them discuss in a fair and competent situation about a conflicting issue. Through this, participants will achieve learning and mature into more responsible citizens.

This research applied the theory and the evaluation methodology of public participation to communication on social media. Although quite a recent phenomenon, social media are transforming the way people communicate and interact with each other. The aim of the study was to understand if the deliberative ideals of public engagement theory are true in the social media environment and to understand what are the potentialities for reducing higher education institutions greenhouse gas emissions through these interventions.

9.1 Theoretical contribution

A primary contribution to knowledge from this study is the application of the principles of public engagement theory to the social media environment, both in the implementation of the campaign and in the evaluation of the process, as it has been assessed through Webler's principles of fairness, competence, and social learning. This contributes to filling the current gap in the literature regarding bottom-up approach to enhancing environmental citizenship in the non-domestic environment.

Moreover, the study also contributes to further the understanding of the ability of social media to have a real world impact, in the context of improving environmental sustainability of institutions. This contributes to filling a current gap in the literature regarding the impact of IT intervention in organisations.

9.2 Methodological contribution

The study has elaborated a methodology for the investigation and evaluation of social media quantitative and qualitative data. Although not completely original, as it was based on similar research in the context of social media impact evaluation, the methodology has been successfully applied for the first time in the context of the evaluation of a participatory communication campaign in a higher education institution. The methodology for evaluation can be considered a valuable contribution for institutions that intend to perform such campaign and who want to measure their performance.

In addition to that, the quantitative data collected from social media have been associated with the qualitative data collected through interviewing participants, whereas traditionally social media interventions are either analysed through a quantitative approach or a qualitative one.

9.3 Summary of findings

The study presented in this thesis aimed to investigate behaviour-change strategies mediated by social media in the higher education institutional context.

Hence the aim of the research is to:

Understand the potential of social media as a vehicle for increasing environmental citizenship and promote pro-environmental behaviour-change.

To meet this aim five objectives were identified; the objectives are here reported, along with a brief overview of the findings.

9.3.1 Objective one

The first objective sought to review current behaviour change theories in organisations. This was achieved through a review of the most recent literature, as presented in Chapter 3.

The literature review starts with a definition of pro-environmental behaviours, these are behaviours that deliberately pursue the reduction of the negative impact of humans' activities on the environment (Stern 2000). After this different approaches to behaviour change are presented, drawing a distinction between informational strategies and structural strategies. The first aim at changing the motivations, perceptions, and norms of the behaviours, whereas structural strategies aim at altering the conditions under which behaviour choices are made (Steg & Vlek 2009).

A third option to behaviour change is then offered: participating in environmental conversations and decision making and nurturing environmental citizenship. Environmental citizenship is characterised by the active participation of citizens in a transition towards sustainability as different studies have demonstrated that participating in pro-environmental activities can enhance environmental citizenship and promote behaviour change (Dobson 2010).

9.3.2 Objective two

The second objective sought to map the rise and development of digital technologies and social media with reference to current trends. This was achieved through a review of the most recent literature, as presented in Chapters 2 and 3.

This was started by giving a definition to digital technologies and social media and in briefly mapping out their evolution since their first appearance. Subsequently, an analysis of digital platforms as a new communication space and of discourse and interaction on social media was performed. Reflecting on the potential of discourse-based social media of creating conversations and engagement the parallels with public engagement theory emerged.

In a second section, the rise of the digital and environmental citizens has been charted, arguing that citizenship is being re-framed by participation on digital technologies. Digital technologies are superficially considered a liberating tool, because they allow citizens to engage in more democratic actions and to participate in local governance, however the gap between awareness and action replicates itself in the digital community.

9.3.3 Objective three

The third objective sought to create and test a methodology for the analysis of a social media participatory campaign and its effectiveness in facilitating public engagement. The methodology was presented in Chapter 4 and then fully explained and applied in Chapter 5 in regards to the quantitative analysis and in Chapter 6 in regards to the qualitative insights.

Chapter 4 illustrated the methodology in-depth; four categories were defined: (1) Growth of community, (2) Engagement, (3) Content Indicators, and (4) Conversations. The proposed methodology proved to be able to measure if a dialogue was created in the community, how large the dialogue was, and what topics nurtured most of the

discussion. On the other hand it disclosed very little on the effect of the dialogue on participants. The overarching outcome of the exploration in the quantitative data allows this research to state that this can only be the first step of a more in-depth investigation about what people can learn during their online participation.

A more in-depth qualitative analysis was considered necessary and was performed through the content analysis of the on-line conversations and semi-structured interviews of the campaign participants. Results from this were presented in Chapter 6 and shed light on the fairness and competence of the process.

9.3.4 Objective four

The fourth objective sought to critically assess the potential of social media as a behaviour change tool leading to behaviour-change and environmental citizenship. This was achieved through the content analysis of in-depth interviews presented in Chapter 6 and 7.

The presented results critically show that social media did have an impact on participants regarding pro-environmental behaviours, but this was limited.

There are issues related with the fairness and competence of the process, which then lead to constraints in the social learning and impact achieved by the intervention. Fairness is in fact not easily achieved in the online discussion; in line with what other scholars have claimed, only a small percentage of people contribute to the majority of the conversations and like-minded people are more likely to participate. Therefore, discussion is less likely to be argumentative and conflicting.

In consideration of the depth and competence of the discussion, which relates to van Dijck (2012) claim that 40% of tweets are a ‘pointless babble’, results showed that participants were not always motivated on discussing their views and opinions in depth and often chose to leave a brief comments without discussing with others, preferred to share a sarcastic or ironic comment, only joined the conversation when

the topic was light-hearted, or did not trust the tools enough to participate in the conversation. This questions the deliberative potential of social media and also their ability to bringing about environmental citizenship and behaviour change. However, there have been occasions where participants were motivated to discuss, in particular when the topic was something highly relevant to them.

In relation to social learning, results show that the impact of the social media campaign have been limited; people did change certain behaviours, but mostly intent-oriented behaviours. As such the impact of the campaign in improving DMU's environmental sustainability have been minimal. Moreover, the process had a deeper impact on existing environmental citizens, than on other participants, as they were more engaged in the process.

This is however a consequence of the incomplete fairness of the process and of the tool chosen for the process; the campaign was more effective in engaging people who were already interested in environmental issues. Hence, the impact of the process had been deeper on them than on others. On the other hand digital citizens reported higher level of learning from social media than others, due to their higher levels of digital literacy. As such the use of social media can be useful in making them better environmental citizens, as they are very open to be influenced by peers on social media. The issue remains how to engage them more effectively in the process.

9.3.5 Objective five

The fifth objective sought to understand the wider opportunities and barriers for future applications of social media and public engagement in organisations. This was achieved through the thorough discussion of results and has been presented in Chapter 8.

Social media share many of the constraints of traditional public participation processes; in the present research they were able to enlarge the overall audience that was in contact with the Sustainability team at DMU, however they mainly engaged

people who shared similar interests. The tendency for online communities is to organise themselves into '*filter bubbles*' (Pariser 2011) and as such individuals will engage in conversations with like-minded individuals. This undermines the deliberative power of social media because it does not amplify exposure to challenging views.

In addition to this, what stands out from the present research is that discourse on social media are often very superficial and engagement is difficult to nurture and this compromised the deliberative power of the process. As such, online deliberation seems to be less effective than offline debates.

Nevertheless, numerous interviewees reported a change in their behaviours as a consequence of the campaign or a reinforcement of already existing behaviours and it is discussed that this is evidence of social learning although changes were minor. In addition, another type of learning was evidenced: organisational learning. Social media were effective in building a community of like-minded individuals within DMU and in making the institution more aware of the pro-environmental attitudes and behaviours of its staff and students.

9.4 Implications and opportunities of use

In this section the implications of the findings are discussed; first with reference to practitioners, second with reference to policymakers, and finally with reference to future research.

9.4.1 Implications for practitioners

This study has implications for practitioners, those who are responsible and seek to find solutions for reducing large organisations' greenhouse gas emissions. Higher education institutions would in fact be interested to understand how social media could help them reduce their emission, through stimulating pro-environmental behaviours in their staff and students. Many institutions already use social media to

communicate with them, although they tend not to have a strategy and adopt ad hoc solutions and messages, as in the case of DMU. The present intervention has shown that engagement with fans and followers is fostered through a constant and consistent presence on social media; demonstrated by the quick drop in SustainableDMU's fans and followers engagement after the close of the campaign. Results have also shown that fostering participation is not as easy as it can appear. People prefer not to be involved in thoughtful and serious conversations on those tools and often choose to participate only when the topic is light-hearted. Moreover, it is difficult to create the 'right' (i.e. fair) group of participants and allow everyone to freely participate might not be the answer to a successful deliberative process on social media. Therefore, care and attention need to be put in choosing the right audience and trying to engage it. In addition, as for any public engagement process, participants need to be given 'power' to deliberate, that is an issue to solve or a decision to make for the university, in order to get together and participate successfully. One of the issue of the present study was specifically that participants were not given an issue to address and this may have influenced not only the engagement, but also the depth reached by the process.

On the other hand, it is true that social media make it possible to reach and stay in contact with a larger number of people. In few weeks SustainableDMU's network almost doubled both on Twitter and Facebook. Although not all of those fans and followers became engaged in the activities, they still were receiving the information and were able to see and participate in the conversations. Social media therefore make it easier to reach the network of people outside the direct audience engaged in the participatory meetings; which is one of the most important issues in the public engagement theory.

Thus the use of social media can be helpful for reducing an institution's carbon emissions thanks to their ability of maintaining an active and constant interest in sustainability in staff and students when optimally managed.

9.4.2 Implications for policymakers

The study also have implications for organisations and policymakers that are immediately involved with higher education and environmental issues, such as the Environmental Association of Universities and Colleges (EAUC), the HEFCE, the National Union of Students (NUS), Universities UK (UUK) and the People and the Planet student action group. Beyond those, the findings are also relevant for policy makers from government departments, such as the Department for Environment Food and Rural Affairs (DEFRA).

This research is particularly timely because institutions and governments, who have been using social media to communicate and engage with their audience for a while, now are trying to define the impact of their efforts in using these tools, to define the merit of such an approach and to classify what are the potentialities for behaviour change. If policymakers are interested in moving their audiences beyond awareness to behaviour-change, these are the challenges they need to focus on:

- Set realistic campaign objectives and acknowledge that if ambitious behaviour-change effects are sought many barriers can play a strong role;
- Make sure that when change in behaviour are sought people are put in the condition of being able to act, that is ensure policy are in place to tackle barriers, such as cost or feasibility;
- Ensure that people are given deliberative power in order to make them feel responsible and empowered by the process and their decision;
- Pre-test and track the impact of the intervention using a combination of quantitative and qualitative methods.

Other research has shown the importance of a bottom-up approach when information is being communicated with the audience (Wilson 2011), but also that the choice of this approach needs to be related to the real intention of involving the public. The research has shown that on social media the characteristics of the process and its impact are similar, but the reach can be far broader.

9.4.3 Limitations and future research

It is recognised that there are some limitations to the findings presented in the present thesis; on the other hand they offer opportunities for future research.

First, the results have been limited by the relatively small sample size and the short intervention and monitoring period. The data presented were collected from a sample of self-selecting participants (in the sense that they self-selected themselves by interacting with SustainableDMU on Twitter and Facebook) and only a small sample of friends of friends, who did not follow SustainableDMU but were active users of social media. No data were collected from people not using social media; however interviewing them could improve the understanding of the barriers in using social media, which is connected with the fairness of the process.

The intervention was also very short; 8 weeks is a very short time for creating a network and a community of participants. Results showed that interaction and depth of the conversations increased towards the end of the campaign, but then quickly dropped when activity from SustainableDMU fell. Therefore the undertaking of a much larger and longitudinal study could not only provide more representative results, but may capture the emergence and influence of new patterns of interaction.

Concerns relating to the size of the intervention relates to generalizability and applicability, therefore are not limited to expanding the findings to the remainder of the population in the case study site, but also to other large organisations and higher education institutions.

Concerns are also relative on the involved researcher; in the social media context, as in any social network analysis implemented through an action research approach, the personality of the involved researcher is key; future research should look at how different personalities can affect the impact of a participatory campaign on participants.

In addition to the implications for future research discussed in the previous section, there are other issues that future research should seek to address. First, a replication

of the study, in a different context would provide data for comparison and verification of the findings. Secondly, future studies should offer alternative communication messages than those utilised here; future studies on the deliberative potential of social media should seek to develop interaction about different or additional issues to better inform the role of characteristics of topic on the success of a participatory social media campaign. It would be particularly interesting to join the qualitative analysis performed during this study to quantitative measures taken on site, that is data able to measure actual reduction in energy and resource use by participants. In addition, it would be interesting to take a holistic perspective and consider the total individual emissions of each participant from the different behaviours; this could be done through measuring their carbon footprint before and after the intervention. The intention of the present research was to do so, but participants joined in during the course of the intervention. Therefore there was no opportunity for the researcher to survey participants ahead of the intervention. Consequently this means that this is a post-test only study, with no pre-test which would have provided data to control for behaviours and levels of environmental citizenship ahead of the campaign intervention.

It must also be noted that the area of research of the present study is quite novel but many studies have been carried out in the past few years; moreover, innovation is very fast in the area of study. As such the findings might be subjected to a temporary validity. This is particularly true from a methodological point of view; when the research started few studies were done on the impact of social media, it was uncommon to use them in the context of sustainability in the built environment, and the scientific literature about the methodology of evaluation of the impact of those tools on online communication or behaviour change was almost non-existent. This lead the researcher to personally design a methodology of investigation; however throughout the study new research were being conducted in other contexts with similar methodology or approach. These have been cited in the beginning chapters and the researcher implemented a methodology that was novel in one sense but not in absolute. This is to say that the area of research is fast-moving, therefore results

need to be carefully considered in this perspective. Social media are transforming the way people interact with each other, are changing individuals, communities and societies; therefore the implications of those tools in the longer term can lead to very different outcomes than the ones here presented.

Another limitation is that all of the data came from self-reported measures, and it is acknowledged that these can direct responses to socially desirable ones (Johnson & Eagly 1989). Self-reporting is however a commonly used method for data collection in behavioural research (Conner et al. 2007; Updegraff et al. 2007) and was the preferred method for this study; nevertheless there is the possibility that some participants might have felt internal pressure to respond in a more socially desirable way than others.

As seen from the results of this study people are structured in almost closed networks, also called 'bubbles', on social media and they prefer to interact with people with similar interests. For this reason it would be interesting to perform a network analysis of how knowledge diffuses in social media network and how it is possible to reach all the different interested parties; is it necessary to involve in the process people from different 'bubbles'? Is it necessary to involve people at the centre of different communities? Or is it sufficient to involve very popular individuals, who are therefore supposed to be more influential, to be able to spread the message and involve more people?

9.5 Conclusions

This thesis documented a case study action research undertaken to explore the potentialities offered by participating in decision-making regarding pro-environmental issues in the institutional context, as they are mediated by social media. The research aimed to address the issue of environmental sustainability associated with the HE sector and how engagement of staff and students using social media can promote behaviour change in engaged individuals. To generate behaviour-

change the two correlated theory of public engagement and environmental citizenship were used.

The findings presented suggest that social learning, behaviour change and enhanced environmental citizenship are achievable through participation using social media, as several interviewees reported a change or a reinforcement of already existing pro-environmental behaviours as a consequence of the campaign. However, the reported changes were minor and it is difficult to advocate that they could noticeably contribute to the requested target of 10% reduction on carbon emission from behaviour change of the HE sector.

In addition to these findings, the research also sheds light on the deliberative power of social media tools. Participation on social media is hardly fair and competent. People are organised in '*filter bubbles', which* makes very difficult a fair recruitment of participants, hence hindering the deliberative power of the process, as participants will share similar views and beliefs. Moreover, also the internal procedural fairness of the discussion is limited, as some voices are more heard than others. Relating to the competence of the process, social media seem to engage participants and foster discussions that are somewhat superficial; this can critically compromise the deliberative power of the process itself.

Even though social media have strong limitations they are today a fundamental part of our society and of HEIs specifically as they engage the younger generations and are fundamental to communicate with students. However, it is important to recognise and address the limits of this approach by incorporating social media in the wider process of achieving energy reduction and reducing the environmental impact of the organisation. The present research showed how social media can in fact be a powerful tool for spreading the message, raising awareness and nurturing participation and collaboration in engaged individuals.

References

Abrahamse, W. et al., 2005. A review of intervention studies aimed at household energy conservation. *Journal of Environmental Psychology*, 25(3), pp.273–291. Available at: http://www.sciencedirect.com/science/article/B6WJ8-4HJ482W-2/2/6e5870081ce8572015fae70203a31988.

Accornero, G. & Ramos Pinto, P., 2015. "Mild mannered"? Protest and mobilisation in Portugal under austerity, 2010–2013. *West European Politics*, 38(3), pp.491–515.

Addley, E., 2011. Gay girl in Damascus hoaxer acted out of "vanity." *Guardian [Online]*, 13. Available at: https://www.theguardian.com/world/2011/jun/13/gay-girl-damascus-tom-macmaster.

Albrechtslund, A., 2008. Online social networking as participatory surveillance. *First Monday*, 13(3). Available at: http://firstmonday.org/ojs/index.php/fm/article/view/2142/1949http%3A.

Allcott, H. & Gentzkow, M., 2017. *Social Media and Fake News in the 2016 Election*, National Bureau of Economic Research.

Althaus, S.L. & Tewksbury, D., 2000. Patterns of Internet and traditional news media use in a networked community. *Political Communication*, 17(1), pp.21–45.

Anduiza, E., Cristancho, C. & Sabucedo, J.M., 2014. Mobilization through online social networks: the political protest of the indignados in Spain. *Information, Communication & Society*, 17(6), pp.750–764.

Archer, M. et al., 1998. *Critical Realism. Essential Readings*, London: Routledge.

Arima, A. et al., 2005. *UN Decade of Education for Sustainable Development 2005-2014*, UNESCO.

Armitage, D., Marschke, M. & Plummer, R., 2008. Adaptive co-management and the paradox of learning. *Global environmental change*, 18(1), pp.86–98.

Arnstein, S.R., 1969. A ladder of citizen participation. *Journal of the American Planning Association*, 35(4), p.216. Available at: http://openurl.library.dmu.ac.uk/sfxlcl3?sid=google&auinit=SR&aulast=Arnstein&atitle=A ladder of citizen participation&id=doi:10.1080/01944366908977225&title=Journal of the American Institute of Planners&volume=35&issue=4&date=1969&spage=216&issn=0002-8991.

Arthur, C., 2006. What is the 1% rule? *The Guardian*. Available at: https://www.theguardian.com/technology/2006/jul/20/guardianweeklytechnologysection2 [Accessed May 18, 2017].

Ashley, M., 2000. Behaviour Change and Environmental Citizenship: A case for spiritual development? *International Journal of Children's Spirituality*, 5(2), pp.131–145. Available at: http://dx.doi.org/10.1080/713670914.

Assembly, U.N.G., 2005. *2005 World Summit Outcome, Resolution A/60/1, adopted by the General Assembly on 15 September 2005*,

Asur, S. & Huberman, B.A., 2010. Predicting the future with social media. In *Web Intelligence and Intelligent Agent Technology (WI-IAT), 2010 IEEE/WIC/ACM International Conference on*. IEEE, pp. 492–499.

Atkinson, P. & Hammersley, M., 1994. Ethnography and Participant Observation. In N. K. Denzin & Y. S. Lincoln, eds. *Handbook of Qualitative Research*. Thousand Oaks, California: Sage Publications, Ltd., pp. 248–260.

Awareness, 2012. *Five Killer Strategies to Dominate Social Media's Big 3: Facebook, Twitter, and YouTube*, Available at: http://info.awarenessnetworks.com/5-Killer-Strategies-For-The-Big-3.html.

Baek, Y.M., Wojcieszak, M. & Delli Carpini, M.X., 2012. Online versus face-to-face deliberation: Who? Why? What? With what effects? *New media & society*, 14(3), pp.363–383.

Bandura, A., 1991. Social Cognitive Theory of Moral Thought and Action. In W. M. Kurtiness & G. J. L., eds. *Handbook of Moral Behavior and Development. Volume 1: Theory*. Hillsdale, NJ: Erlbaum Associate Publishers.

Bandura, A., 1986. *Social foundations of thoughts and actions: a social cognitive theory*, Englewoods Cliffs, N.Y.: Prentice Hall.

Bandura, A., 1971. *Social Learning Theory. Motivational trends in society*, Morristow N.Y.: General Learning Press.

Barber, N., Taylor, C. & Strick, S., 2009. Wine consumers' environmental knowledge and attitudes: Influence on willingness to purchase. *International Journal of Wine Research*, 1(1), pp.59–72.

Barker, M. et al., 2012. *Social Media Marketing. A Strategic Approach* Internatio., CENGAGE Learning South-Western.

Barnes, N.G. & Lescault, A.M., 2011. Social media adoption soars as higher-ed experiments and reevaluates its use of new communications tools. *Center for Marketing Research. University of Massachusetts Dartmouth, North Dartmouth, MA*.

Barnett, J. et al., 2005. *Environmental Citizenship: Literature Review*, Bristol.

Barthel, M. et al., 2015. The evolving role of news on Twitter and Facebook. *Pew Research Center*, 14.

Bartiaux, F., 2007. Does environmental information overcome practice compartimentalisation and change consumers` behaviours? *Journal of Cleaner Production*, 16, pp.1170–1180.

Bartlett, D., 2011. *Going green: The psychology of sustainability in the workplace*, London.

Bawden, D. & Robinson, L., 2009. The dark side of information: overload, anxiety and other paradoxes and pathologies. *Journal of information science*, 35(2), pp.180–191.

BBC, 2010. *BBC climate change poll - February 2010*, Available at: http://news.bbc.co.uk/nol/shared/bsp/hi/pdfs/05_02_10climatechange.pdf.

Becker, H., Naaman, M. & Gravano, L., 2011. Beyond trending topics: Real-world event identification on Twitter. In *Proceedings of WSM*.

Beckman, L., 2001. Virtue, sustainability and liberal values. In J. Barry & M. Wissenburg, eds. *Sustaining Liberal Democracy: Ecological Challenges and Opportuni- ties,*. Houndmills: Palgrave, pp. 179–191.

Bell, D.R., 2004. Creating Green Citiznes? Political Liberalism and Environmental Education. *Journal of Phylosophy of Education*, 38(1), pp.37–53.

Bell, D.R., 2005. Liberal Environmental Citizenship. *Environmental Politics*, 14(2), pp.179–194. Available at: http://dx.doi.org/10.1080/09644010500054863.

Benn, R., 2000. The genesis of active citizenship in the learning society. *Studies in the Education of Adults*, 32(2), pp.241–256.

Bennett, W.L. & Segerberg, A., 2011. Digital media and the personalization of collective action: Social technology and the organization of protests against the global economic crisis. *Information, Communication & Society*, 14(6), pp.770–799.

Benton, T., 1991. Biology and social science. *Sociology*, 25, pp.1–29.

Berglund, C. & Matti, S., 2006. Citizen and consumer: the dual role of individuals in environmental policy. *Environmental Politics*, 15(4), pp.550–571. Available at:

http://dx.doi.org/10.1080/09644010600785176.

Bhaskar, R., 1978. *A Realist Theory of Science*, Hassock: Harvester Press.

Blaagaard, B. & Chouliaraki, L., 2014. Cosmopolitanism and the New News Media. In *Journalism Studies*. Routledge.

Blackler, F., 1995. Knowledge, Knowledge Work and Organizations: An Overview and Interpretation. *Organization Studies* , 16(6), pp.1021–1046. Available at: http://oss.sagepub.com/content/16/6/1021.abstract.

Blake, J., 1999. Overcoming the "Value-Action Gap" in Environmental Policy: tensions between national policy and local experience. *Local Environment*, 4(3), pp.257–278.

Bohdanova, T., 2014. Unexpected revolution: the role of social media in Ukraine's Euromaidan uprising. *European View*, 13(1), pp.133–142.

Borden, R.J. & Schettino, A.P., 1979. Determinants of environmentally responsible behaviour. *Journal of Environmental Education*, 10, pp.35–39.

Boyd, D., 2014. *It's complicated: The social lives of networked teens*, Yale University Press.

Boyd, D., 2010. "Privacy and Publicity in the Context of Big Data." *danah boyd*. Available at: http://www.danah.org/papers/talks/2010/WWW2010.html.

Boyd, D. & Marwick, A., 2011. Social privacy in networked publics: teens' attitudes, practices and strategies. A decade in internet time. In *Symposium on the Dynamics of the Internet and Society.*

Boyd, D.M. & Ellison, N.B., 2007. Social network sites: Definition, history, and scholarship. *Journal of computer-mediated communication*, 13(1), p.210. Available at: http://openurl.library.dmu.ac.uk/sfxlcl3?sid=google&auinit=DM&aulast=Boyd&a

title=Social network sites: Definition, history, and scholarship&id=doi:10.1111/j.1083-6101.2007.00393.x&title=Journal of computer-mediated communication&volume=13&issue=1&date=2008&spage=210&issn=1083-6101.

Bradley, P., 2010. Be where the conversations are: The critical importance of social media. *Business Information Review*, 27(4), pp.248–252.

Brannen, J., 1992. *Mixing Methods: Qualitative and Quantitative Research*, Aldershot: Avebury.

Brauchler, B., 2005. *Cyberidentities at War: Der Molukkenkonflikt im Internet*. Bielefeld.

Brewer, J., 2000. *Ethnography*, Buckingham: Open University.

Briones, R.L. et al., 2011. Keeping up with the digital age: How the American Red Cross uses social media to build relationships. *Public Relations Review*, 37(1), pp.37–43. Available at: http://www.sciencedirect.com/science/article/pii/S0363811110001335.

Broersma, M. & Graham, T., 2013. TWITTER AS A NEWS SOURCE. *Journalism Practice*, 7(4), pp.446–464. Available at: http://dx.doi.org/10.1080/17512786.2013.802481.

Bruns, A., 2008. *Blogs, Wikipedia, Second Life, and beyond: From production to produsage*, Peter Lang.

Bryan, G., Cohen, R. & Stepan, P., 2011. *Wider Public Sector Emissions Reduction Potential Research*, Depatment of Energy and Climate Change.

Bryman, A., 1992. Quantitative and qualitative research: further reflections on their integration. In J. Brannen, ed. *Mixing Methods: Qualitative and Quantitative Research*. Aldershot: Avebury.

Bryman, A., 2004. *Social Research Methods* Second edi., New York: Oxford University Press Inc.

Bull, R., 2014. Trying to climb the ladder: A “research in the wild” study of participation and engagement for energy demand reduction in non-domestic buildings.

Bull, R., Fleming, P. & Stuart, G., 2014. Policy, “politicking” and organisational culture – Lessons in engaging employees in energy reduction.

Bull, R., Petts, J. & Evans, J., 2008. Social learning from public engagement: dreaming the impossible? *Journal of Environmental Planning and Management*, 51(5), pp.701–716.

Burgess, J., Harrison, C.M. & Filius, P., 1998. Environmental communication and the cultural politics of environmental citizenship. *Environment and Planning A*, 30(8), pp.1445–1460.

Burgess, J., Harrison, C.M. & Filius, P., 1998. Environmental communication and the cultural politics of environmental citizenship. *Environment and Planning A*, 30(8), pp.1445–1460. Available at: http://www.envplan.com/abstract.cgi?id=a301445.

Burrows, R., Johnson, H. & Johnson, P., 2013. *Influencing Values, Attitudes and Behaviour via Interactive and Social-Media Technology : The Case of Energy Usage.*, Bath, UK.

Byrne, B., 2004. Qualitative interviewing. In C. Seale, ed. *Researching Society and Culture*. London: Sage Publication, pp. 179–192.

CabinetOffice, 2012. *Social media guidance for civil servants*, London. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/62361/Social_Media_Guidance.pdf.

Canada, E., 2004. *An environmental citizen... who me?*,

Carlson, N., 2010. At Last–The full story of how facebook was founded. *Business Insider*, 5(3).

Carolan, M., 2004. Ontological politics: Mapping a complex of environmental problem. *Environmental Values*, 13, pp.497–522.

Carolan, M.S., 2005. Society, Biology, and Ecology: Bringing Nature Back Into Sociology's Disciplinary Narrative Through Critical Realism . *Organization & Environment* , 18(4), pp.393–421. Available at: http://oae.sagepub.com/content/18/4/393.abstract.

Carr, N., 2010. *The Shallows: How the Internet is Changing the Way We Think, Read and Remember*, London: Atlantic Books.

Carter, M.A., 2013. Third party observers witnessing cyber bullying on social media sites. *Procedia-Social and Behavioral Sciences*, 84, pp.1296–1309.

Castells, M., 2007. Communication, power and counter-power in the network society. *International journal of communication*, 1(1), p.29.

CBSNews, 2016. 60 minutes Donald Trump family. Available at: http://www.cbsnews.com/news/60-minutes-donald-trump-family-melania-ivanka-lesley-stahl/.

Chetty, M., Tran, D. & Grinter, R.E., 2008. Getting to Green: Understanding Resource Consumption in the Home. In *Proceedings of the 10th International Conference on Ubiquitous Computing*. UbiComp '08. New York, NY, USA: ACM, pp. 242–251. Available at: http://doi.acm.org/10.1145/1409635.1409668.

Christakis, N.A., 2008. Social Networks are Like the Eye. J. Brockman, ed. , (9th June 2011). Available at: http://www.edge.org/documents/archive/edge238.html.

Coghlan, D. & Brannick, T., 2001. *Doing Action Research in Your Own Organization*, London: Sage Publication.

Cohen, R., 2008. The Obama Connection. *The New York Times*.

COI/DEFRA, 2007. *Public Attitude to Climate Change Wave 5, found at http://www.climatechallenge.gov.uk/communicate/what_do_people_think.html accessed July 25, 2007*,

Coleman, J.S. & Coleman, J.S., 1994. *Foundations of social theory*, Harvard university press.

Collins, J. et al., 2003. *Carrots, sticks and sermons: influencing public behaviour for environmental goals. A Demos/Green Alliance report produced for DEFRA*, Demos/Green Alliance.

Conner, M.T. et al., 2007. Relations between implicit and explicit measures of attitudes and measures of behavior: evidence of moderation by individual difference variables. *Personality and social psychology bulletin*, 33(12), pp.1727–1740.

Cooper, C. et al., 2007. Citizen science as a tool for conservation in residential ecosystems. *Ecology and Society*, 12(2).

Creswell, J.W. & Vicki, L.P.C., 2007. *Designing and conducting mixed methods research*, Thousand Oaks, California: Sage Publication, Inc.

Crompton, T. & Thøgersen, J., 2009. *Simple & painless? The limitation of spillover in environmental campaign* W.-U. S. for C. Project, ed., Surrey: WWF. Available at: www.wwf.org.uk/strategiesforchange.org.uk.

Crowley, D.N., Curry, E. & Breslin, J.G., 2014. Leveraging Social Media and IoT to Bootstrap Smart Environments. In N. Bessis & C. Dobre, eds. *Big Data and Internet of Things: A Roadmap for Smart Environments*. Spinger International Publishing Switzerland, pp. 379–399.

Dahlberg, L., 2001a. Computer-Mediated Communication and The Public Sphere: A Critical Analysis. *Journal of Computer-Mediated Communication*, 7(1), p.0.

Available at: http://dx.doi.org/10.1111/j.1083-6101.2001.tb00137.x.

Dahlberg, L., 2001b. The Internet and democratic discourse: Exploring the prospects of online deliberative forums extending the public sphere. *Information, Communication & Society*, 4(4), pp.615–633.

Dahlgren, P., 2013. *The political web: Media, participation and alternative democracy*, Palgrave Macmillan Basingstoke.

Dahlgren, P., 2011. Young Citizen and Political Participation. *Taiwan Journal of Democracy*, 7(2), pp.11–25.

Dahlstrand, U. & Biel, A., 1997. Pro-Environmental Habits: Propensity Levels in Behavioral Change. *Journal of Applied Social Psychology*, 27(7), pp.588–601.

Danemark, B. et al., 2002. *Explaining society. Critical realism in the social science*, Abingdon, Oxon: Routledge.

Darnton, A., 2008. *An overview of behaviour change models and their use*, GSR.

Darnton, A., 2008. *GSR Behaviour Change Knowledge Review. Reference Reposrt: An overview of behaviour change models and their uses*,

Davis, C.H.F. et al., 2012. Social Media in Higher Education: A literature review and research directions.

Debatin, B. et al., 2009. Facebook and online privacy: Attitudes, behaviors, and unintended consequences. *Journal of Computer-Mediated Communication*, 15(1), pp.83–108. Available at: http://onlinelibrary.wiley.com/doi/10.1111/j.1083-6101.2009.01494.x/full.

DEFRA & Department for Environment, F. and Ru.A., 2008. *A framework for pro-environmental behaviours*, London: Department for Environment, Food and Rural Affairs.

Denzin, N.K. & Lincoln, Y.S., 2000. *The Handbook of Qualitative Research* 2nd editio.,

Thousand Oaks, California: Sage Publications.

DePoy, E. & Gitlin, L., 1998. *Introduction to Research: Understanding and Applying Multiple Strategies* 2nd Edition, ed., London: Mosby.

Diamond, L., 2010. Liberation technology. *Journal of Democracy*, 21(3), pp.69–83.

van Dijck, J., 2012. Facebook as a Tool for Producing Sociality and Connectivity. *Television and New Media*, 13(2), pp.160–176.

Van Dijck, J., 2013. *The culture of connectivity: A critical history of social media*, Oxford University Press.

Van Dijck, J., 2009. Users like you? Theorizing agency in user-generated content. *Media, culture & society*, 31(1), pp.41–58.

DMU, 2016. *ANNUAL ACCOUNTS 2015–2016*, Available at: https://www.dmu.ac.uk/documents/about-dmu-documents/university-governance/annual-reports/dmu-annual-accounts-2015-16.pdf.

DMU, 2014. DMU ranked most influential UK university on Twitter. Available at: http://www.dmu.ac.uk/about-dmu/news/2014/december/dmu-ranked-most-influential-uk-university-on-twitter-.aspx.

DMU, 2015. *DMU Strategic Framework 2015-2020*, Available at: http://www.dmu.ac.uk/documents/about-dmu-documents/university-governance/strategic-framework-2015-2020.pdf.

DMU, 2011. *Strategic Plan 2011-15*, De Montfort University. Available at: http://www.dmu.ac.uk/documents/about-dmu-documents/executive-board/dmu-strategic-plan.pdf.

Dobson, A., 2004. Citizenship and the Ecological Challenge. In *Environment and Citizenship workshop of the European Consortium of Political Research*. Uppsala, Sweden.

Dobson, A., 2003. Citizenship and the Environment.

Dobson, A., 2007. Environmental citizenship: towards sustainable development. *Sustainable Development*, 15(5), pp.276–285. Available at: 10.1002/sd.344.

Dobson, A., 2010. *Environmental citizenship and pro-environmental behaviour. Rapid research and evidence review*, London.

Dobson, A. & Bell, D., 2006. *Environmental citizenship*, Cambridge, Massachusettes: The MIT Press. Available at: http://openurl.library.dmu.ac.uk/sfxlcl3?sid=FirstSearch%253AWorldCat&genre=book&isbn=9780262025904&title=Environmental citizenship&date=2006&aulast=Dobson&aufirst=Andrew&id=doi%253A&pid=%253Caccession number%253E318396162%253C%252Faccession number%253E%253Cfssessid%253E0%253C%252Ffssessid%253E&url_ver=Z39.88-2004&rfr_id=info%253Asid%252Ffirstsearch.oclc.org%253AWorldCat&rft_val_fmt=info%253Aofi%252Ffmt%253Akev%253Amtx%253Abook&req_dat=%253Csessionid%253E0%253C%252Fsessionid%253E&rfe_dat=%253Caccessionnumber%253E318396162%253C%252Faccessionnumber%253E&rf.

Dryzek, J., 2000. *Deliberative Democracy and Beyond*, Oxford: Oxford University Press.

Dryzek, J., 1990. *Discursive Democracy*, Cambridge: Cambridge University Press.

Dunlap, R.E. et al., 2000. Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale. *Journal of Social Issues*, 56(3), pp.425–442.

Duvanova, D., Semenov, A. & Nikolaev, A., 2015. Do social networks bridge political divides? The analysis of VKontakte social network communication in Ukraine. *Post-Soviet Affairs*, 31(3), pp.224–249.

Dwyer, C., Hilts, S.R. & Passerini, K., 2007. Trust and privacy concern within social

networking sites: A comparison of Facebook and MySpace. In *Proceedings of the Thirteenth America's Conference on Information Systems*. Keystone, Colorado. Available at: http://csis.pace.edu/~dwyer/research/DwyerAMCIS2007.pdf.

EEA, 2013. *Achieving energy efficinecy through behaviour change: what does it take?*,

Ess, C., 1996. Beyond false dilemmas: Men and women on the net-a plea for democracy and understanding. *Computer-Mediated Communication Magazine*, 3(1).

Etzion, D., 2007. Research on Organizations and the Natural Environment, 1992-Present: A Review. *Journal of Management*, 33(4), pp.637–664. Available at: http://dx.doi.org/10.1177/0149206307302553.

Evans, D., 2011. *The Internet of Things How the Next Evolution of the Internet Is Changing Everything*, San Jose, California, USA. Available at: http://www.cisco.com/c/dam/en_us/about/ac79/docs/innov/IoT_IBSG_0411FINAL.pdf.

Facebook.com, 2013. Page Post Metrics. Available at: https://www.facebook.com/help/336143376466063/.

Facebook, N., 2017. Facebook Statistics. Available at: http://newsroom.fb.com/company-info/.

Ferro, E. & Molinari, F., 2010. Framing Web 2.0 in the process of public sector innovation: Going down the participation ladder. *European Journal of ePractice*, 9, pp.1–15.

Few, R. et al., 2006. *Public participation and climate change adaptation* T. C. for C. C. Research, ed.,

Finnis, J., Chan, S. & Clements, R., 2011. *Let's get real. How to Evaluate Online Success? Report from the Culture24 Action Research Project*, Brighton. Available at: http://www.keepandshare.com/doc/3148918/culture24-

howtoevaluateonlinesuccess-2-pdf-september-19-2011-11-15-am-2-5-meg?da=y.

Fischer, C., 2008. Feedback on household electricity consumption: a tool for saving energy? *Energy Efficiency*, 1(1), pp.79–104. Available at: http://dx.doi.org/10.1007/s12053-008-9009-7.

Fischer, E. & Reuber, A.R., 2011. Social interaction via new social media: (How) can interactions on Twitter affect effectual thinking and behavior? *Journal of Business Venturing*, 26(1), pp.1–18. Available at: http://www.sciencedirect.com/science/article/B6VDH-515RHH4-1/2/f317c309d4ab75506b6e965a7a3ff81c.

Fischer, F., 2000. *Citizens, experts, and the environment: The politics of local knowledge*, Duke University Press.

Fisher, J. & Irvine, K., 2010. Reducing household energy use and carbon emissions: The potential for promoting significant and durable changes through group participation. In *Proceedings of the IESD PhD Conference: Energy and Sustainable Development, Leicester, UK*. pp. 49–57.

Flaxman, S., Goel, S. & Rao, J., 2016. Filter bubbles, echo chambers, and online news consumption. *Public Opinion Quarterly*, p.nfw006.

Flew, T., 2008. Participatory Media Cultures. In *New Media. An Introduction*. Oxford: Oxford University Press, pp. 106–125.

Fogg, B.J., 2009. A Bahvior Model for Persuasive Design. In *Persuasive 2009. 4th International Conference on Persuasive Technology*. Claremont, California, USA.

Foster, D., Blythe, M., et al., 2010. Competitive carbon counting: can social networking sites make saving energy more enjoyable? *Proceedings of the 28th of the international conference extended abstracts on Human factors in computing systems*.

Foster, D., Linehan, C., et al., 2010. Motivating Physical Activity at Work: Using Persuasive Social Media for Competitive Step Counting. In *Proceedings of the 14th International Academic MindTrek Conference: Envisioning Future Media Environments*. MindTrek '10. New York, NY, USA: ACM, pp. 111–116. Available at: http://doi.acm.org/10.1145/1930488.1930510.

Foster, D. et al., 2011. Power ballads: deploying aversive energy feedback in social media. In *CHI 2011*. Vancouver, Canada.

Foster, D. et al., 2012. "Watts in It for Me?": Design Implications for Implementing Effective Energy Interventions in Organisations. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '12. New York, NY, USA: ACM, pp. 2357–2366. Available at: http://doi.acm.org/10.1145/2207676.2208396.

Foster, D., Lawson, S., et al., 2010. Wattsup?: Motivating Reductions in Domestic Energy Consumption Using Social Networks. In *Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries*. NordiCHI '10. New York, NY, USA: ACM, pp. 178–187. Available at: http://doi.acm.org/10.1145/1868914.1868938.

Frey, B.S. & Stutzer, A., 2006. Environmental Morale and Motivation. *SSRN eLibrary, Working Paper*, 288. Available at: http://ssrn.com/paper=900370.

Friedkin, N.E., 2006. *A structural theory of social influence*, Cambridge University Press.

Fuchs, C., 2007. *Internet and society: Social theory in the information age*, Routledge.

Fuchs, C., 2012. Social media, riots, and revolutions. *Capital & Class* , 36(3), pp.383–391. Available at: http://cnc.sagepub.com/content/36/3/383.abstract.

Fuchs, C., 2017. *Social media: A critical introduction*, Sage.

Gabrys, J., 2014. Programming environments: environmentality and citizen sensing in

the smart city. *Environment and Planning D: Society and Space*, 32(1), pp.30–48.

Galis, V. & Neumayer, C., 2016. Laying claim to social media by activists: a cyber-material détournement. *Social media+ society*, 2(3), p.2056305116664360.

Gardner, G.T. & Stern, P.C., 2008. The Short List: The Most Effective Actions U.S. Households Can Take to Curb Climate Change. *Environment: Science and Policy for Sustainable Development*, 50(5), pp.12–25. Available at: http://dx.doi.org/10.3200/ENVT.50.5.12-25.

Gavin, N.T., 2010. Pressure Group Direct Action on Climate Change: The Role of the Media and the Web in Britain - A Case Study. *The british Journal of Politics and International Relations*, 12, pp.459–475.

Geller, E.S., 2002. The challenge of increasing proenvironment behavior. *Handbook of environmental psychology*, 2, pp.525–540.

Ghonim, W., 2012. *Revolution 2.0*, Fourth Estate.

Gillham, B., 2000. *Developing a Questionnaire*, London: Continuum.

Google/MMA, 2012. *Our Mobile Planet: UK Understanding the Mobile Consumer*, Available at: http://ssl.gstatic.com/think/docs/our-mobile-planet-united-kingdom_research-studies.pdf.

Government Digital Service, 2012. *Social media guidance for civil servants*, London.

Gray, D.E., 2004. *Doing research in the real world*, London Thousand Oaks New Delhi: SAGE Publications.

Greenwood, J.D. & Levin, M., 2000. Reconstructing the Relationship Between Universities and Society Through Action Research. In N. K. Denzin & Y. S. Lincoln, eds. *The Handbook of Qualitative Research*. Thousand Oaks, California: Sage Publication.

Grimmelmann, J., 2009. Privacy as product safety. *Widener LJ*, 19, p.793.

Gross, R. & Acquisti, A., 2005. Information Revelation and Privacy in Online Social Networks. In *Proceedings of the 2005 ACM Workshop on Privacy in the Electronic Society*. WPES '05. New York, NY, USA: ACM, pp. 71–80. Available at: http://doi.acm.org/10.1145/1102199.1102214.

Guba, E.G., 1985. The Context of Emergent Paradigm Research. In *Organization Theory and Inquiry: The Paradigm Revolution*. Beverly Hills, California: Sage Publication.

Habermas, J., 1979. *Communication and the Evolution of Society, translated by Thomas McCarthy*, Boston: Beacon Press.

Habermas, J., 1987. *The Theory of Communicative Action, Volume 2. Lifeworld and System: A Critique of Functionalist Reason* T. Tanslated by McCarthy, ed., Boston: Beacon Press.

Habermas, J., 1984. *The Theory of Communicative Action. Volume 1: Reason and the Rationalization of Society* Blackwell., Oxford.

Håkansson, P. & Witmer, H., 2015. Social media and trust: a systematic literature review.

Hammersley, M., 1996. The relationship between qualitative and quantitative research - paradigm loyalty versus methodological selectivism. In J. Richardson, ed. *Handbook of Qualitative Methods for Psychological and the Social Science*. Leicester: BPS Books.

Hammersley, M. & Atkinson, P., 1983. *Ethnography: Principles in practice*, London: Tavistock.

Hampton, K. & Wellman, B., 2003. Neighboring in Netville: How the Internet supports community and social capital in a wired suburb. *City & Community*, 2(4), pp.277–311.

Harris, K., 2008. Using social networking sites as student engagement tools. *Diverse*

issues in Higher Education, 25(18), p.4.

Hawthorne, M. & Alabaster, T., 1999. Citizen 2000: development of a model of environmental citizenship. *Global Environmental Change*, 9(1), pp.25–43. Available at: http://www.sciencedirect.com/science/article/pii/S0959378098000223.

Hayward, T., 2000. Constitutional Environmental Rights: a Case for Political Analysis. *Political Studies*, 48(3), pp.558–572. Available at: http://dx.doi.org/10.1111/1467-9248.t01-1-00275.

He, H.A., Greenberg, S. & Huang, E.M., 2010. One Size Does Not Fit All: Applying the Transtheoretical Model to Energy Feedback Technology Design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '10. New York, NY, USA: ACM, pp. 927–936. Available at: http://doi.acm.org/10.1145/1753326.1753464.

Healy, P., 1992. Planning through debate: the communicative turn in planning theory. *Twon Planning Review*, (63), pp.143–162.

HEFCE, 2010. *Carbon management strategies and plans: A guide to good practice*, Bristol.

HEFCE, 2009. *Research into a carbon reduction target and strategy for higher education in England*, Bristol: SQW Consulting, Edinburgh, Scotland. Available at: http://www.hefce.ac.uk/media/hefce/content/pubs/2009/rd1609/rd16_09.pdf.

HEFCE, 2014. *Sustainable development in higher education. HEFCE's role to date and a framework for its future actions*,

Hemp, P., 2009. Death by Information Overload. *Harvard Business Review*, 87(9), pp.82–89. Available at: citeulike-article-id:5725501.

Heravi, B.R. & Harrower, N., 2016. Twitter journalism in Ireland: sourcing and trust in the age of social media. *Information, Communication & Society*, 19(9), pp.1194–

1213. Available at: http://dx.doi.org/10.1080/1369118X.2016.1187649.

Herring, S. et al., 2002. Searching for Safety Online: Managing "Trolling" in a Feminist Forum. *The Information Society*, 18, pp.371–384.

Himelboim, I., McCreery, S. & Smith, M., 2013. Birds of a feather tweet together: Integrating network and content analyses to examine cross-ideology exposure on Twitter. *Journal of Computer-Mediated Communication*, 18(2), pp.40–60.

Hine, V., 2000. *Virtual Ethnography*, London: Sage Publication.

Hines, J.M., Hungerford, H.R. & Tomera, A.N., 1987. Analysis and synthesis of research on responsible environmental behaviour: a meta-analysis. *Journal of Environmental Education*, 18, pp.1–8.

Hobson, K., 2002. Competing Discourses of Sustainable Consumption: Does the "Rationalisation of Lifestyles" Make Sense? *Environmental Politics*, 11(2), pp.95–120. Available at: http://dx.doi.org/10.1080/714000601.

Hodas, N.O. & Lerman, K., 2014. The simple rules of social contagion. *Scientific reports*, 4, p.4343.

Holotescu, C. & Grosseck, G., 2009. Indicators for the analysis of learning and practice communities from the perspective of microblogging as a provocative sociolect in virtual space. In *Conference proceedings of» eLearning and Software for Education «(eLSE)*. Universitatea Nationala de Aparare Carol I, pp. 163–174.

Honeycut, C. & Herring, S., 2009. Beyond Microblogging: Conversation and Collaboration via Twitter. In *ProceedingsoftheForty-SecondHawai'iInternationalConferenceonSystemSciences(HICSS-42)*. Los Alamitos, CA: IEEE Press.

Horton, D., 2005. Demonstrating Environmental Citizenship? A Study of Everyday Life among Green Activists. In A. Obson & D. Bell, eds. *Environmental Citizenship*. Cambridge: The MIT Press, pp. 127–150.

Howto.gov, 2013. Social Media Metrics for Federal Agencies. Available at: http://www.howto.gov/social-media/using-social-media-in-government/metrics-for-federal-agencies.

Huckle, J., 2004. Critical realism: a philosophical framework for higher education for sustainability. In P. Blaze Corcoran & A. E. J. Wals, eds. *Higher Education and the Challenge of Sustainability. Problematics, Promise, and Practice*. Dordrecht, The Nederlands: Kluwer Academic Publisher, pp. 33–47.

Hughes, J.A., 1990. *The Philosophy of Social Research*, Harlow: Longmans.

Hunter, S.M., Vizelberg, I.A. & Berenson, G.S., 1991. Identifying mechanisms of adoption of tobacco and alcohol use among youth: The Bogalusa heart study. *Social Networks*, 13(1), pp.91–104.

Hyde, M., 2015. A world without online petitions? Where do I sign? *The Guardian*. Available at: https://is.gd/jeeyOp.

ING, 2012. *Consumer find social media increasingly trustworthy. Information posted on social media increasingly alters opinions and behaviour.*, Available at: http://ing-group.pr.co/34147-consumers-find-social-media-increasingly-trustworthy.

Institute, H.R., 2012. *Social media "likes" healthcare: From marketing to social business*,

IPCC, 2013. *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report on the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia,* Cambridge, United Kingdom and New York, USA. Available at: http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf.

Irwin, A., 1995. *Citizen Science*, London: Routledge.

Irwin, A., 2001. Constructing the scientific citizen: Science and democracy in the biosciences. *Public Understanding of Science* , 10(1), pp.1–18. Available at: http://pus.sagepub.com/content/10/1/1.abstract.

Irwin, A., Simmons, P. & Walker, G., 1999. Faulty environments and risk reasoning: the local understanding of industrial hazards. *Environment and Planning A*, 31(7), pp.1311–1326. Available at: http://www.envplan.com/abstract.cgi?id=a311311.

Jackson, T. & Surrey, U. of, 2005. *Motivating Sustainable Consumption a review of evidence on consumer behaviour and behavioural change/a report to the Sustainable Development Research Network* S. D. R. Network, ed., Surrey: Centre for Environmental Strategy. Available at: www.surrey.ac.uk/CES.

Jagers, S.C., 2009. In search of the Ecological citizen. *Environmental Politics*, 18(1), pp.18–26.

Janda, K.B., 2011. Buildings dont use energy: people do. *Architectural science review*, 54(1), p.15. Available at: http://openurl.library.dmu.ac.uk/sfxlcl3?sid=google;auinit=KB;aulast=Janda;atitle=Buildings dont use energy: people do;id=doi:10.3763/asre.2009.0050;title=Architectural science review;volume=54;issue=1;date=2011;spage=15;issn=0003-8628.

Janis, I., 1989. Groupthink: The problems of conformity. *Creative Organization Theory*, pp.224–228.

Jelin, E., 2000. Towards a Global Environmental Citizenship? *Citizenship Studies*, 4(1), pp.47–63.

Jenkins, H., Ford, S. & Green, J., 2013. *Spreadable media: Creating value and meaning in a networked culture*, NYU press.

Jennings, M.K. & Zeitner, V., 2003. Internet use and civic engagement: A longitudinal analysis. *Public Opinion Quarterly*, 67(3), pp.311–334.

Johnson, B.T. & Eagly, A.H., 1989. Effects of involvement on persuasion: A meta-analysis. *Psychological Bulletin*, 106(2), p.290.

Juris, J.S., 2012. Reflections on# Occupy Everywhere: Social media, public space, and emerging logics of aggregation. *American Ethnologist*, 39(2), pp.259–279.

Kalafatis, S.P. et al., 1999. Green marketing and Ajzen's theory of planned behaviour: a cross-market examination. *Journal of Consumer Marketing*, 16(5), pp.441–460. Available at: http://dx.doi.org/10.1108/07363769910289550.

Kant, I. & Guyer, P., 1998. *Critique of pure reason*, Cambridge University Press.

Kaplan, A.M. & Haenlein, M., 2010. Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, 53(1), pp.59–68. Available at: http://www.sciencedirect.com/science/article/pii/S0007681309001232.

Keen, A., 2008. *The Cult of Amateur*, New York: Doubleday.

Kendall, L., 1999. Recontextualising "Cyberspace": Methodological Considerations for On-Line Research. In S. G. Jones, ed. *Doing Internet Research. Critical Issues and Methods for Examining the Net*. London/Thousand Oaks/New Delhi: Sage Publication, pp. 57–74.

Kent, M.L. & Taylor, M., 1998. Building dialogic relationships through the World Wide Web. *Public relations review*, 24(3), pp.321–334.

Kollmuss, A. & Agyeman, J., 2002. Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), pp.239–260. Available at: http://www.tandfonline.com/doi/abs/10.1080/13504620220145401.

Kreiss, D., 2015. The networked democratic spectator. *Social Media+ Society*, 1(1), p.2056305115578876.

Krimsky, S., 2007. Risk communication in the internet age: The rise of disorganized

skepticism. *Environmental Hazards*, 7, pp.157–164.

Kulathuramaiyer, N. & Maurer, H., 2015. A Survey of Communications and Collaborative Web Technologies. *Journal of Computing and Information Technology*, 23(1), pp.1–18.

Kumar, R. et al., 2010. Structure and Evolution of Online Social NetworksLink Mining: Models, Algorithms, and Applications. In Springer New York, pp. 337–357. Available at: http://dx.doi.org/10.1007/978-1-4419-6515-8_13.

Kurkov, A., 2014. *Ukraine diaries: dispatches from Kiev*, Random House.

Kwak, H. et al., 2010. What is Twitter, a social network or a news media? In *Proceedings of the 19th international conference on World wide web*. ACM, pp. 591–600.

Lehman, P.K. & Geller, E.S., 2004. Behavior analysis and environmental protection: Accomplishments and potential for more. *Behavior and social issues*, 13(1), p.13.

Lehrer, D. & Vasudev, J., 2010. Visualizing Information to Improve Building Performance: A study of expert users. *Center for the Built Environment*.

Lehrer, D., Vasudev, J. & Kaam, S., 2012. *Evaluating a Social Media Applications for Conserving Energy and Improving Operations in Commercial Buildings*, Available at: http://www.escholarship.org/uc/item/7d45v4n4#.

Lenhart, A. & Madden, M., *Teens, privacy, & online social networks.*, Available at: http://www.pewinternet.org/~/media//Files/Reports/2007/PIP_Teens_Privacy_SNS_Report_Final.pdf.pdf.

Lewinski, M. & Dima, M., 2012. Deliberate Design or Unintended Consequences: The Argumentative Uses of Facebook During the Arab Spring. *Journal of Public Deliberation*, 8(1), pp.1–11.

Lewis, J.D. & Weigert, A., 1985. Trust as a social reality. *Social Forces*, 63(4), pp.967–

985.

Lewis, K. et al., 2008. Tastes, ties, and time: a new social network dataset using Facebook.com. *Social Networks*, 30(4), pp.330–342.

Lincoln, A., 2011. FYI: TMI: Toward a holistic social theory of information overload. *First Monday; Volume 16, Number 3 - 7 March 2011*. Available at: http://firstmonday.org/ojs/index.php/fm/article/view/3051/2835.

Liss, J., 2011. Negotiating the Marcellus: the role of information in building trust in extractive deals. *Negotiation Journal*, 27(4), pp.419–446.

Lorenzoni, I., Nicholson-Cole, S. & Whitmarsh, L., 2007a. Barriers perceived to engaging with climate change among the UK public and their policy implications. *Global Environmental Change*, 17(3–4), pp.445–459. Available at: http://www.sciencedirect.com/science/article/B6VFV-4NF2NFN-1/2/bb681ad5419f242dafe742309fc3d149.

Lorenzoni, I., Nicholson-Cole, S. & Whitmarsh, L., 2007b. Barriers perceived to engaging with climate change among the UK public and their policy implications. *Global Environmental Change*, 17, pp.445–459.

Luck, E. & Ginanti, A., 2013. Online Environmental Citizenship: Blogs, Green Marketing and consumer sentiment in the 21st Century. *Electronic Green Journal* , 1(35). Available at: http://www.escholarship.org/uc/item/3kg578ph.

Lukman, R. et al., 2013. Addressing the attitudinal gap towards improving the environment: a case study from a primary school in Slovenia. *Journal of Cleaner Production*, 48, pp.93–100. Available at: http://www.sciencedirect.com/science/article/pii/S0959652611003052.

Lunnay, B. et al., 2015. Ethical use of social media to facilitate qualitative research. *Qualitative health research*, 25(1), pp.99–109.

Lupton, D., 2014. “Feeling better connected”: academics’ use of social media.

Luque, E., 2005. Researching Environmental Citizenship and its Publics. *Environmental Politics*, 14(2), pp.211–225. Available at: http://dx.doi.org/10.1080/09644010500054947.

Lynch, M., 2011. After Egypt: The limits and promise of online challenges to the authoritarian Arab state. *Perspectives on politics*, 9(2), pp.301–310.

MacGregor, S. & Szerszynski, B., 2003. Environmental citizenship and the administration of life. In *Citizenship and the Environment Workshop*. Newcastle University.

Maignan, I. & Ralston, D.A., 2002. Corporate social responsibility in Europe and the US: Insights from businesses' self-presentations. *Journal of International Business Studies*, 33(3), pp.497–514.

Manjoo, F., 2016. Social media's globe-shaking power. *New York Times*, 16.

McChesney, R.W., 2013. *Digital disconnect: How capitalism is turning the Internet against democracy*, New Press, The.

McKenna, L. & Pole, A., 2004. Do blogs matter? Weblogs in American politics. In American Political Science Association.

McKenzie-Mohr, D., 2000a. Fostering sustainable behavior through community-based social marketing. *American psychologist*, 55(5), p.531.

McKenzie-Mohr, D., 2000b. Promoting Sustainable Behavior: An Introduction to Community-Based Social Marketing. *Journal of Social Issues*, 56(3), pp.543–554.

Merkle, D.M., 1996. The polls. Review. The national Issues Convention Deliberative Poll. *Public Opinion Quarterly*, 60(4), pp.588–619.

Miranda, J. et al., 2015. From the Internet of Things to the Internet of People. *IEEE Internet Computing*, 19(2), pp.40–47.

Mitchell, W.J. & Casalegno, F., 2009. Connected sustainable cities.

Monforti, J.L. & Marichal, J., 2014. The role of digital skills in the formation of generalized trust among Latinos and African Americans in the United States. *Social Science Computer Review*, 32(1), pp.3–17.

Moreno, M.A. et al., 2013. Ethics of social media research: Common concerns and practical considerations. *Cyberpsychology, Behavior, and Social Networking*, 16(9), pp.708–713.

Morgan, D.L., 1998. Practical Strategies for Combining Qualitative and Quantitative Methods: Application for Health Research. *Qualitative Health REsearch*, 8, pp.362–376.

Morozov, E., 2011. *The Net Delusion: The Dark Side of Internet Freedom*, New York: Public Affairs.

Morris, L., 2014. Contextualizing the power of social media: Technology, communication and the Libya Crisis. *First Monday*, 19(12).

Morton, H., 2001. Computer-Mediated Communication in Australian Anthropology and Sociology. *Social Analysis Journal of Cultural and Socisl Practice*, 45(1).

Muldoon, A., 2006. Where the green is: Examining the paradox of environmentally conscious consumption. *Electronic Green Journal*, 1(23).

Naess, A. & Kumar, S., 1992. *Deep ecology*, Phil Shepherd Production.

Nash, N. & Lewis, A., 2005. Overcoming Obstacles to Ecological Citizenship: The Dominant Social Paradigm and Local Environmentalism. In A. Obson & D. Bell, eds. *Environmental Citizenship*. Cambridge: The MIT Press, pp. 153–184.

Network, G.F., 2012. *The national Footprint Accounts, 2011 edition*, Oakland, CA, USA. Available at: Gemma Cranston.

Neuteleers, S., 2010. Institutions versus lifestyle: do citizens have environmental

duties in their private sphere? *Environmental Politics*, 19(4), pp.501–517.

Nussbaum, E., 2007. Kids, the Internet, and the end of privacy. *New York Magazine*. Available at: http://nymag.com/news/features/27341/.

O`Neill, S. & Boykoff, M., 2011. The Role of New Media in Engaging the Public with Climate Change. In L. Whitmarsh, S. O'Neill, & I. Lorenzioni, eds. *Engaging the Public with Climate Change.* London: Earthscan.

Oates, S. & Moe, W.W., 2016. Donald Trump and the'Oxygen of Publicity': Branding, Social Media, and Mass Media in the 2016 Presidential Primary Elections.

Ockwell, D., Whitmarsh, L. & O`Neill, S., 2009. Reorienting Climate Change Communication for Effective Mitigation: Forcing People to be Green or Fostering Grass-Roots Engagement? *Science Communication*, 30(3), pp.305–327. Available at: http://scx.sagepub.com/cgi/content/abstract/30/3/305.

Ones, D. & Dilchert, S., 2012. Environmental Sustainability at Work: A Call to Action. *Industrial and Organizational Psychology*, 5(4).

Orr, A., 2011. Revolution 2.0: Wael Ghonim Thanks Mark Zuckenberg for His Part in The Egyptian Revolution. *Technocrati.com*.

Owens, S., 2000. "Engaging the public": information and deliberation in environmental policy. *Environment and Planning A*, 32(7), pp.1141–1148. Available at: http://www.envplan.com/abstract.cgi?id=a3330.

Owens, S. & Driffill, L., 2008. How to change attitudes and behaviours in the context of energy. *Energy Policy*, 36, pp.4412–4418.

Pariser, E., 2011. *The Filter Bubble*, UK: Penguin Press.

Passy, F. & Giugni, M., 2001. Social Networks and Individual Perceptions: Explaining Differential Participation in Social Movements. *Sociological Forum*, 16(1), pp.123–153. Available at: http://www.jstor.org/stable/685032.

Pentina, I. & Tarafdar, M., 2014. From “information” to “knowing”: Exploring the role of social media in contemporary news consumption. *Computers in Human Behavior*, 35, pp.211–223.

Petrovic, S. et al., 2013. Can twitter replace newswire for breaking news? In *Seventh international AAAI conference on weblogs and social media*.

Petts, J., 2001. Evaluating the Effectiveness of Deliberative Processes: Waste Management Case-studies. *Journal of Environmental Planning and Management*, 44(2), pp.207–226. Available at: http://www.tandfonline.com/doi/abs/10.1080/09640560120033713.

Petts, J., 2006. Managing Public Engagement to Optimize Learning: Reflections from Urban River Restoration. *Human Ecology Review*, 13(2), pp.172–181.

Petts, J., 1995. Waste Management Strategy Development: A Case Study of Community Involvement and Consensus-Building in Hampshire. *Journal of Environmental Planning and Management*, 38(4), pp.519–536.

Petts, J. & Brooks, C., 2006. Expert conceptualisations of the role of lay knowledge in environmental decisionmaking: challenges for deliberative democracy. *Environment and Planning A*, 38(6), pp.1045–1059. Available at: http://www.envplan.com/abstract.cgi?id=a37373.

PewResearchCenter, 2014a. *Digital Life in 2025. The Internet of Things Will Thrive by 2025*, Available at: http://www.pewinternet.org/2014/05/14/internet-of-things/.

PewResearchCenter, 2009. *Fewer Americans see solid evidence of global warming.*, Available at: http://people-press.org/report/556/global-warming.

PewResearchCenter, 2017. Social Media Fact Sheet. Available at: http://www.pewinternet.org/fact-sheet/social-media/ [Accessed April 25, 2017].

PewResearchCenter, 2014b. *The Web at 25*, Available at:

http://www.pewinternet.org/2014/02/25/the-web-at-25-in-the-u-s.

Pianosi, M., 2012. Climate Witness - WWF (The witnesses in the UK). *Wordpress.com*. Available at: http://thelivinglabiesd.wordpress.com/2012/10/08/climate-witness-wwf-the-witnesses-in-the-uk/.

Pianosi, M., Bull, R. & Rieser, M., 2014. Is there a role for social media in enhancing environmental citizenship? Lessons from a UK case study. In *ECSM2014-Proceedings of the European Conference on Social Media: ECSM 2014*. Academic Conferences Limited, p. 394.

Piccolo, L.S.G. et al., 2014. Motivating online engagement and debates on energy consumption. In *Proceedings of the 2014 ACM conference on Web science*. ACM, pp. 109–118.

Piccolo, L.S.G. & Alani, H., 2015. Perceptions and behaviour towards climate change and energy savings: the role of social media.

Pirages, D. & Ehrlich, P.R., 1974. *Ark II; Social response to environmental imperatives*, New York: Viking Press.

Portwood-Stacer, L., 2013. Media refusal and conspicuous non-consumption: The performative and political dimensions of Facebook abstention. *New Media & Society*, 15(7), pp.1041–1057.

Prell, C. et al., 2010. Competing structure, competing views: the role of formal and informal social structures in shaping stakeholder perceptions. *Ecology and society*, 15(4), p.34.

Qureshi, S. & Zigurs, I., 2001. Paradoxes and prerogatives. *Communications of the ACM*, 44(12), pp.85–88.

Reed, M.S. et al., 2010. What is social learning? *Ecology and Society*, 15(4). Available at: http://www.ecologyandsociety.org/vol15/iss4/resp1/.

Reuben, R., 2009. The use of social media in higher education for marketing and communications: A guide for professionals in higher education.

Rheingold, H., 2002. *Smart Mobs: The Next Social Revolution*, New York: Perseus Books.

Rheingold, H., 1993. *The virtual community: Finding commection in a computerized world*, Addison-Wesley Longman Publishing Co., Inc.

Richardson, J.E. & Stanyer, J., 2011. Reader opinion in the digital age: Tabloid and broadsheet newspaper websites and the exercise of political voice. *Journalism* , 12(8), pp.983–1003. Available at: http://jou.sagepub.com/content/12/8/983.abstract.

Riche, Y., Dodge, J. & Metoyer, R.A., 2010. Studying Always-on Electricity Feedback in the Home. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '10. New York, NY, USA: ACM, pp. 1995–1998. Available at: http://doi.acm.org/10.1145/1753326.1753628.

Ritchie, J. & Lewis, J., 2003. *Qualitative Research Practice. A Guide for Social Science Students and Researchers*, London: SAGE Publications.

Ritter, A., Cherry, C. & Dolan, B., 2010. Unsupervised modeling of Twitter conversations. In *Human Language Technologies: The 2010 Annual Conference of the North American Chapter of the Association for Computational Linguistics*. Association for Computational Linguistics, pp. 172–180.

Robelia, B.A., Greenhow, C. & Burton, L., 2011. Environmental learning in online social networks: Adopting environmentally responsible behaviors. *Environmental Education Research*, 17(4), pp.553–575.

Roberts, J.M., 2014. *New media and public activism: Neoliberalism, the state and radical protest in the public sphere*, Policy Press.

Robson, C., 2002. *Real world research* Second edi., Malden, USA: BLACKWELL

Publishing.

Rodriguez, M.G., Gummadi, K. & Schoelkopf, B., 2014. Quantifying information overload in social media and its impact on social contagions. *arXiv preprint arXiv:1403.6838*.

Rokka, J. & Moisander, J., 2009. Environmental dialogue in online communities: negotiating ecological citizenship among global travellers. *International Journal of Consumer Studies*, 33(2), pp.199–205.

Rosenstiel, T. & Mitchell, A., 2012. *Arab-American Media*, Washington. Available at: http://www.journalism.org/2012/11/28/role-social-media-arab-uprisings/.

Santucci, G., 2010. The internet of things: Between the revolution of the internet and the metamorphosis of objects. *Vision and Challenges for Realising the Internet of Things*, pp.11–24.

Schultz, P.W., 2000. Empathizing With Nature: The Effect of Perspective Taking on Concern for Environmental Issues. *Journal of Social Issues*, 56(3), pp.391–406.

Schultz, P.W., 2002. Knowledge, information, and household recycling: Examining the knowledge-deficit model of behavior change. *New tools for environmental protection: Education, information, and voluntary measures*, pp.67–82.

Schultz, P.W. et al., 2007. The Constructive, Destructive, and Reconstructive Power of Social Norms. *Psychological Science* , 18(5), pp.429–434. Available at: http://pss.sagepub.com/content/18/5/429.abstract.

Schweidel, D.A. & Moe, W.W., 2014. Listening in on social media: a joint model of sentiment and venue format choice. *Journal of Marketing Research*, 51(4), pp.387–402.

Scott, P.R. & Jacka, J.M., 2011. *Auditing social media: A governance and risk guide*, John Wiley & Sons.

SDC, 2006. *I will if you will Towards sustainable consumption*, London. Available at: http://www.sd-commission.org.uk/data/files/publications/I_Will_If_You_Will.pdf.

Seyfang, J., 2006. Ecological citizenship and sustainable consumption: Examining local organic food networks. *Journal of Rural Studies*, 22(4), pp.383–395.

Shah, D. V et al., 2005. Information and expression in a digital age: Modeling Internet effects on civic participation. *Communication research*, 32(5), pp.531–565.

Shannon Greenwood, Andrew, D. & Maeve, P., 2016. *Social Media Update 2016*, Washingtong, D.C. Available at: http://www.journalism.org/2012/11/28/role-social-media-arab-uprisings/.

Sharma, P., 2009. Core Characteristics of Web 2.0 Services. , (01/09/2011). Available at: http://www.techpluto.com/web-20-services/.

Shirky, C., 2008. *Here Comes Everybody*, London: Penguin.

Shove, E., 2010. Beyond the ABC: climate change policy and theories of social change. *Environment and Planning*, 42, pp.1273–1285.

Sicari, S. et al., 2015. Security, privacy and trust in Internet of Things: The road ahead. *Computer Networks*, 76, pp.146–164.

Silverman, D., 2006. *Interpreting Qualitative Data. Methods for Analysing Talk, Text and Interaction* Third Edit., London: Sage Publications, Ltd.

Skeggs, B. & Yuill, S., 2016. Capital experimentation with person/a formation: how Facebook's monetization refigures the relationship between property, personhood and protest. *Information, Communication & Society*, 19(3), pp.380–396.

Smith, J.K., 1983. Quantitative versus Qualitative Research: An Attempt to Clarify the Issue. *Educational Researcher*, 12, pp.6–13.

Solove, D.J., 2007. *The future of reputation: Gossip, rumor, and privacy on the Internet*, Yale University Press.

Sormanen, N. & Dutton, W.H., 2015. The role of social media in societal Change: Cases in Finland of fifth estate activity on facebook. *Social Media+ Society*, 1(2), p.2056305115612782.

Sovacool, B.K., 2014. What are we doing here? Analyzing fifteen years of energy scholarship and proposing a social science research agenda. *Energy Research & Social Science*, 1, pp.1–29. Available at: http://www.sciencedirect.com/science/article/pii/S2214629614000073.

Spence, A. et al., 2010. *Public perceptions of climate change and energy futures in britain: summary findings of a survey conducted in January-March 2010. Technical Report (Understanding Risk Working Paper 10–01)*, Cardiff, UK.

Spurling, N. et al., 2013. *Interventions in practice: re-framing policy approaches to consumer behaviour*,

Stake, R.E., 2005. Qualitative Case Studies. In N. K. Denzin & Y. S. Lincoln, eds. *The Sage Handbook of Qualitative Research*. Thousand Oaks: Sage Publication.

Statista, 2017a. Leading social networks worldwide as of April 2017, ranked by number of active users. *Statista.com*. Available at: https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/ [Accessed April 25, 2017].

Statista, 2017b. Smartphone penetration rate in the United Kingdom (UK) from 2010 to 2017. *Statista.com*. Available at: https://www.statista.com/statistics/270888/smartphone-penetration-in-the-united-kingdom-uk/.

Statistics, O. for N., 2015. *Internet Access- Households and Individuals, 2015*, Available at:

http://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ons/dcp171778_412758.pdf.

Steg, L. & Vlek, C., 2009. Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, 29(3), pp.309–317. Available at: http://www.sciencedirect.com/science/article/pii/S0272494408000959.

Stern, N., 2007. *The Economics of Climate Change: The Stern Review*, London.

Stern, P.C. et al., 1999. A Value-Belief-Norm Theory of Support for Social Movements: The Case of Environmentalism. *Human Ecology Review*, 6(2), pp.81–97.

Stern, P.C., 1999. Information, Incentives, and Proenvironmental Consumer Behavior. *Journal of Consumer Policy*, 22(4), pp.461–478. Available at: http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=2975989&site=ehost-live.

Stern, P.C., 2000. Toward a Coherent Theory of Environmentally Significant Behavior. *Journal of Social Issues*, 56(3), pp.407–424.

Sterne, J., 2010. *Social Media Metrics. How to measure and optimize your marketing investment*, Hoboken, New Jersey: John Wiley & Sons, Inc.

Stevenson, W.B. & Greenberg, D., 2000. Agency and social networks: Strategies of action in a social structure of position, opposition, and opportunity. *Administrative Science Quarterly*, 45(4), pp.651–678.

Stewart, A., Ambrose-Oji, B. & Morris, J., 2012. *Social Media and Forestry: A Scoping Report*,

Stringer, E.T., 1999. *Action research* Second., Thousand Oaks, California: Sage Publications, Inc.

Stringer, E.T., 1996. *Action Research. A Handbook for Practitioners*, Thousand Oaks,

California: Sage Publications, Inc.

Stringer, L.C. et al., 2007. Unpacking "participation" in the adaptive management of socio-ecological systems: a critical review. *Ecology and Society*, 11(2), p.39. Available at: http://www.ecologyandsociety.org/vol11/iss2/art39/.

Surowiecki, J., 2005. *The wisdom of crowds*, Anchor.

Sustein, C., 2008. *Infotopia: How Many Minds Produce Knowledge*, Oxford: Oxford University Press.

Swartzfager, B., 2007. Twitter as Alert System?

Talpin, J. & Wojcik, S., 2010. Deliberating Environmental Policy Issues: Comparing the Learning Potential of Online and Face-To-Face Discussions on Climate Change. *Policy & Internet*, 2(2), pp.61–93. Available at: http://www.psocommons.org/policyandinternet/vol2/iss2/art4.

Tapscott, D. & Williams, A.D., 2008. *Wikinomics: How mass collaboration changes everything*, Penguin.

Theocharis, Y. et al., 2015. Using Twitter to mobilize protest action: online mobilization patterns and action repertoires in the Occupy Wall Street, Indignados, and Aganaktismenoi movements. *Information, Communication & Society*, 18(2), pp.202–220.

Thogersen, J., 2007. Social marketing of alternative transportation modes.

Thøgersen, J. & Ölander, F., 2003. Spillover of environment-friendly consumer behaviour. *Journal of Environmental Psychology*, 23(3), p.225. Available at: http://openurl.library.dmu.ac.uk/sfxlcl3?sid=google&auinit=J&aulast=Thøgersen&atitle=Spillover of environment-friendly consumer behaviour&title=Journal of environmental psychology&volume=23&issue=3&date=2003&spage=225&issn=0272-4944.

Thompson, J.B., 1995. *The Media and Modernity: A Social Theory of the Media*, Stanford, California: Standfor University Press.

Times, F., 2014. Definition of social media monitoring. Available at: http://lexicon.ft.com/Term?term=social-media-monitoring.

Tippett, J. et al., 2005. Social learning in public participation in river basin managementâ€"early findings from HarmoniCOP European case studies. *Environmental Science & Policy*, 8(3), pp.287–299. Available at: http://www.sciencedirect.com/science/article/pii/S1462901105000389.

Torgerson, D., 1999. *The promise of green politics: Environmentalism and the public sphere*, Duke University Press.

Tsimonis, G. & Dimitriadis, S., 2014. Brand strategies in social media. *Marketing Intelligence & Planning*, 32(3), pp.328–344.

UNEP, 2002. *Annual report of the International Environmental Technology Centre*, United nations Environmental Programme. Available at: http://www.unep.org/pdf/annualreport/UNEP_Annual_Report_2002.pdf.

UNESCO, 1977. *Intergovernmental Conference on Environmental Education*, Tbilisi (USSR).

UNFCCC, 1998. *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, Available at: http://unfccc.int/resource/docs/convkp/kpeng.pdf.

Updegraff, J.A. et al., 2007. The effects of message quality and congruency on perceptions of tailored health communications. *Journal of Experimental Social Psychology*, 43(2), pp.249–257.

Urbandictionary.com, 2009. Go Viral Definition. Available at: http://www.urbandictionary.com/define.php?term=go viral.

Uslaner, E.M., 2004. Trust, civic engagement, and the Internet. *Political Communication,*, 21(2), pp.223–242.

Valenzuela, S., Park, N. & Kee, K.F., 2009. Is there social capital in a social network site?: Facebook use and college students' life satisfaction, trust, and participation. *Journal of Computer-Mediated Communication*, 14(4), pp.875–901.

Vis, F., 2013. Twitter as a reporting tool for breaking news: Journalists tweeting the 2011 UK riots. *Digital journalism*, 1(1), pp.27–47.

Wals, A.E.J., 2007. Learning in a changing world and changing in a learning world: reflexively fumbling towards sustainability. *Southern African Journal of Environmental Education*, 24(1), pp.35–45.

WCU, UNEP & WWF, 1991. *Caring for the Earth: A Strategy for Sustainable Living*, Gland, Switzerland. Available at: https://portals.iucn.org/library/efiles/documents/CFE-003.pdf.

Weber, M., 1949. Objectivity in Social Science and Social Policy. In E. A. Shils & H. A. Finch, eds. *The Methodology of the Social Sciences*. New York: Free Press, pp. 50–112.

Webler, T., 1995. `Right` discourse in citizen participation: an evaluative yard-stick. In O. Renn, T. Webler, & P. Wiedemann, eds. *Fairness and Competence in Citizen Participation: Evaluating Models for Environmental Discourse*. Dordrecht: Kluver Academic Press, pp. 35–77.

Webler, T., Kastenholz, H. & Renn, O., 1995. Public Participation in Impact Assessment: A Social Learning Perspective. *Environmental impact assessment review*, 15(5), pp.443–463. Available at: http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6V9G-3Y5FWPT-8-1&_cdi=5898&_user=698911&_pii=019592559500043E&_origin=browse&_coverDate=09/30/1995&_sk=999849994&view=c&wchp=dGLbVtb-

zSkzk&md5=4cc977aa8c4c63998ea7626c5da81f6d&ie=/sdarticle.pdf.

Webler, T. & Tuler, S., 2000. Fairness and competence in citizen participation: Theoretical reflections from a case study. *Administration & Society*, 32(5), p.566. Available at: http://proquest.umi.com/pqdweb?did=62811014&Fmt=7&clientId=27520&RQT=309&VName=PQD.

Webler, T., Tuler, S. & Krueger, R., 2001. What is a good public participation process? Five perspectives from the public. *Environmental Management*, 27(3), pp.435–450.

Weinberg, B.D. et al., 2013. Destination social business: Exploring an organization's journey with social media, collaborative community and expressive individuality. *Journal of interactive marketing*, 27(4), pp.299–310.

White, R. et al., 2005. *Conflict Management, Participation, Social Learning and Attitudes in Biodiversity Conservation*, Unknown Publisher. Available at: http://www.alter-net.info/SITE/UPLOAD/DOCUMENT/outputs%255CANet_WPR4_2005_03_Confl_Part_SL_Attitudes2.pdf.

Whitmarsh, L., O'Neill, S. & Lorenzoni, I., 2011. Climate change or social change? Debate within, amongst, and beyond disciplines. *Environment and Planning A*, 43(2), pp.258–261. Available at: http://www.envplan.com/abstract.cgi?id=a43359.

Wikström, P., 2015. Not even real words: User construals of Twitter discourse as "talk-like." In *MOOD-Z Microanalysis of online data; Online communication, discourse, and context; Zürich, July 16-17, 2015*.

Wilburn, J., 2008. Using Twitter for Higher Ed. Available at: https://jeremywilburn.wordpress.com/2008/03/04/using-twitter-for-higher-ed/ [Accessed May 16, 2017].

Wildemeersch, D. et al., 1998. Social learning: a new perspective on learning in participatory systems. *Studies in continuing education*, 20(2), pp.251–265.

Wilson, C., 2011. *The role of communication in encouraging sustainable behaviour*. De Montfort University.

Winter, S.J., Prozesky, H. & Esler, K.J., 2007. A case study of landholder attitudes and behaviour toward the conservation of renosterveld, a critically endangered vegetation type in Cape Floral Kingdom, South Africa. *Environmental Management*, 40(1), pp.46–61.

Wolf, J., 2011. Ecological Citizenship as Public Engagement with Climate Change. In L. Whitmarsh, S. O'Neill, & I. Lorenzoni, eds. *Engaging the Public with Climate Change. Behaviour Change and Communication*. London: Earthscan.

Wolf, J., Brown, K. & Conway, D., 2009. Ecological citizenship and climate change: perceptions and practice. *Environmental Politics*, 18(4), pp.503–521.

Wynne, B., 1996. May the sheep safely graze. In S. Lash, B. Szerszynski, & B. Wynne, eds. *Risk, Environment and Modernity*. London: Sage Publication.

Xu, J.-M. et al., 2012. Learning from bullying traces in social media. In *Proceedings of the 2012 conference of the North American chapter of the association for computational linguistics: Human language technologies*. Association for Computational Linguistics, pp. 656–666.

Yardi, S. & Boyd, D., 2010. Dynamic debates: An analysis of group polarization over time on twitter. *Bulletin of Science, Technology & Society*, 30(5), pp.316–327.

Ybarra, M.L. & Mitchell, K.J., 2008. How risky are social networking sites? A comparison of places online where youth sexual solicitation and harassment occurs. *Pediatrics*, 121(2), pp.e350–e357.

Yin, R.K., 2003. *Case study research: design and methods* Third., Thousand Oaks: Sage Publications.

Youmans, W. & York, J., 2012. Social Media and the Activist Toolkit: User Agreements, Corporate Intersts, and the Information Infrastructure of Modern Social Movements. *Journal of Communication*, 62, pp.315–329.

De Young, R., 1993. Changing behavior and making it stick. *Environment and Behavior*, 25(3), p.485. Available at: http://openurl.library.dmu.ac.uk/sfxlcl3?sid=google;auinit=R;aulast=De Young;atitle=Changing behavior and making it stick;id=doi:10.1177/0013916593253003;title=Environment and behavior;volume=25;issue=3;date=1993;spage=485;issn=0013-9165.

Zappavigna, M., 2014. Coffeetweets: bonding around the bean on Twitter. *The language of social media: Communication and community on the Internet*, pp.139–160.

Zappavigna, M., 2012. *Discourse of Twitter and Social Media*, London: Bloomsbury Academic.

Zhang, W. et al., 2009. The revolution will be networked: The influence of social networking sites on political attitudes and behavior. *Social Science Computer Review*, 28, pp.75–92.

Zhao, D. & Rosson, M.B., 2009. How and why people Twitter: the role that micro-blogging plays in informal communication at work. In *Proceedings of the ACM 2009 international conference on Supporting group work*. ACM, pp. 243–252.

Zhuo, J., 2015. Where anonymity breeds contempt. *The Composition of Everyday Life, Concise*, p.393.

Zimmer, M., 2010. “But the data is already public”: on the ethics of research in Facebook. *Ethics and Information Technology*, 12(4), pp.313–325. Available at: http://dx.doi.org/10.1007/s10676-010-9227-5.

de Zúñiga, H.G., Copeland, L. & Bimber, B., 2014. Political consumerism: Civic

engagement and the social media connection. *New Media & Society*, 16(3), pp.488–506.

Appendix A - Baseline survey

Appendix B - List of Tweets and Facebook post published by @SustainableDMU

Find the list of tweets posted by SustainableDMU at this link:

https://drive.google.com/file/d/0B03tQaOH1LnMZFpWQ3ktTVdaZzQ/view?usp=sharing

Find the list of Facebook posts shared by SustainableDMU at this link:

https://drive.google.com/file/d/0B03tQaOH1LnMWGl6ZVMzbGtuZzA/view?usp=sharing

Appendix C - Interview questions

Section 0: Introducing them/Role at DMU

5. To begin with can you tell me a little about yourself and your role at DMU?
    - What's your job title?
    - In which building are you mostly based in?

Section 1: Understanding position about social media. Did SM change their lives and their pro-environmental behaviours?

6. You are an active user of social media. Whatdo you think of when I say social media?
7. How do you use them?
    - How much you use them daily and in which way?
    - How often do you interact with others on social media?
    - Which type of information/amenities do you look for on social media?
    - Would you survive one week without SM?
8. What is the biggest impact social media has on your life?
    - Can you give me an example of that?
9. Do you think it is possible to use social media to have an 'influence' on others with similar interests?
    - Can you give me an example of that?
    - Have you tried/changed any behaviour following a suggestion on Twitter/Facebook in the last two months? Ever?
    - Who made the suggestion?
    - Why did you choose to act?

Section 2: Understanding position about climate change, responsibility, and environmental citizenship at DMU

10. What do you think sustainability means for DMU? / What do you think about the way sustainability is embedded in the overall university?

- You may know sustainability is one of the key objectives of DMU, it`s in the plan for the next years. Do you feel it in your everyday life at DMU?/Do you think there is a culture of sustainability @DMU?
- Who do you think is or should be responsible to take action for sustainability?
- Is there anything you do to save energy/help the planet at DMU?
- Can you give me an example?
- Why you do so?
- Is there anything that helps you to save energy for example?
- Is there anything that stops you from saving energy, or from recycling?
- What about the shared appliances, e.g. lights, printers, etc.?
- Have you suggested estates or anyone else in DMU about how to reduce energy use, or increase recycling, etc. at DMU?

11. You have been following SustainableDMU for a while now. What do you think about the campaign that was running on SustainableDMU in the last two months?
    - Why did you choose to start following SustainableDMU?
    - What do you think of the environmental campaign that has been running on SustainableDMU in the last months?
    - What did you like more about SustainableDMU?
    - What you didn't like?
    - What would you like to see more on it?
    - Did you read the information that was being shared?
    - Did you participate in the discussion?
    - Did you change any behaviour as a result of the campaign?
    - Did you do anything differently after seeing/participating in discussion with @SustainableDMU?
12. Do you think it is possible to change people behaviours towards a pro-environmental model with social media?
    - How?

- How do you think the use of social media is different compared to TV or newspaper?
- Do you think SM can be more effective? Why?
- Do any of your friends became interested in sustainability because you were sharing `green` information on your profile?

13. If you`d have to engage with others in pro-environmental behaviours using social media, what would you do?
    - Can you give me an example of that?

Section 3: Understanding position about climate change, responsibility, and environmental citizenship in private life

14. What is your opinion about climate change? / Can you explain to me what do you think of climate change?
    - To what degree do you think CC is a result of human behaviour or natural causes?
    - Are you concerned about the effect of CC? For yourself, your children, nature, the world?
    - Why are you concerned?
    - Do you feel you have a responsibility toward mitigating climate change?
15. What do you think about the idea of paying taxes for environmental purpose?
    - For example a tax on flying or a personal carbon allowance?
    - Do you think this would discourage people on using the car, or flying for example?
    - Would that discourage you?
    - Why? / Why not?
16. What do you think about being involved in non-governmental environmental organisations or in charities or community projects?
    - Are you involved in any of them?
    - How are you involved?
    - Why do you care about that?

Section 4: Evaluating pro-environmental behaviour after the campaign following the responses on the questionnaire

17. You said you were ... are you still doing it?
    - Why did you decide to do it?
    - Why are you maintaining it?